NEW ZEALAND
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DECEMBER - 1958

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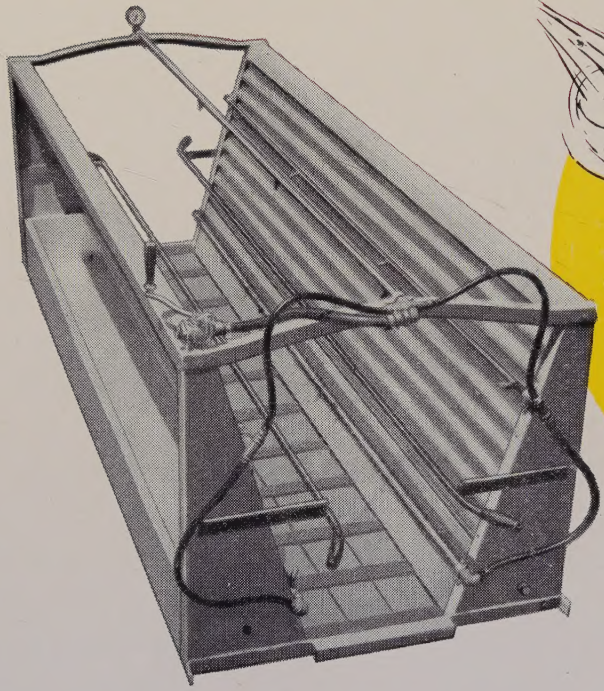

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Though New Zealand's native flora shows great diversity, species with large brightly coloured flowers are rare. An exception is Clianthus puniceus, *shown on this month's cover, which has long been a favourite ornamental shrub for home gardens. It is sometimes called the red kowhai or kaka beak. Clianthus must always have been rare in the wild state, and according to some authorities would have become extinct had the shrub not been cultivated by the Maoris and later by European settlers. Photograph by Douglas Elliott.*

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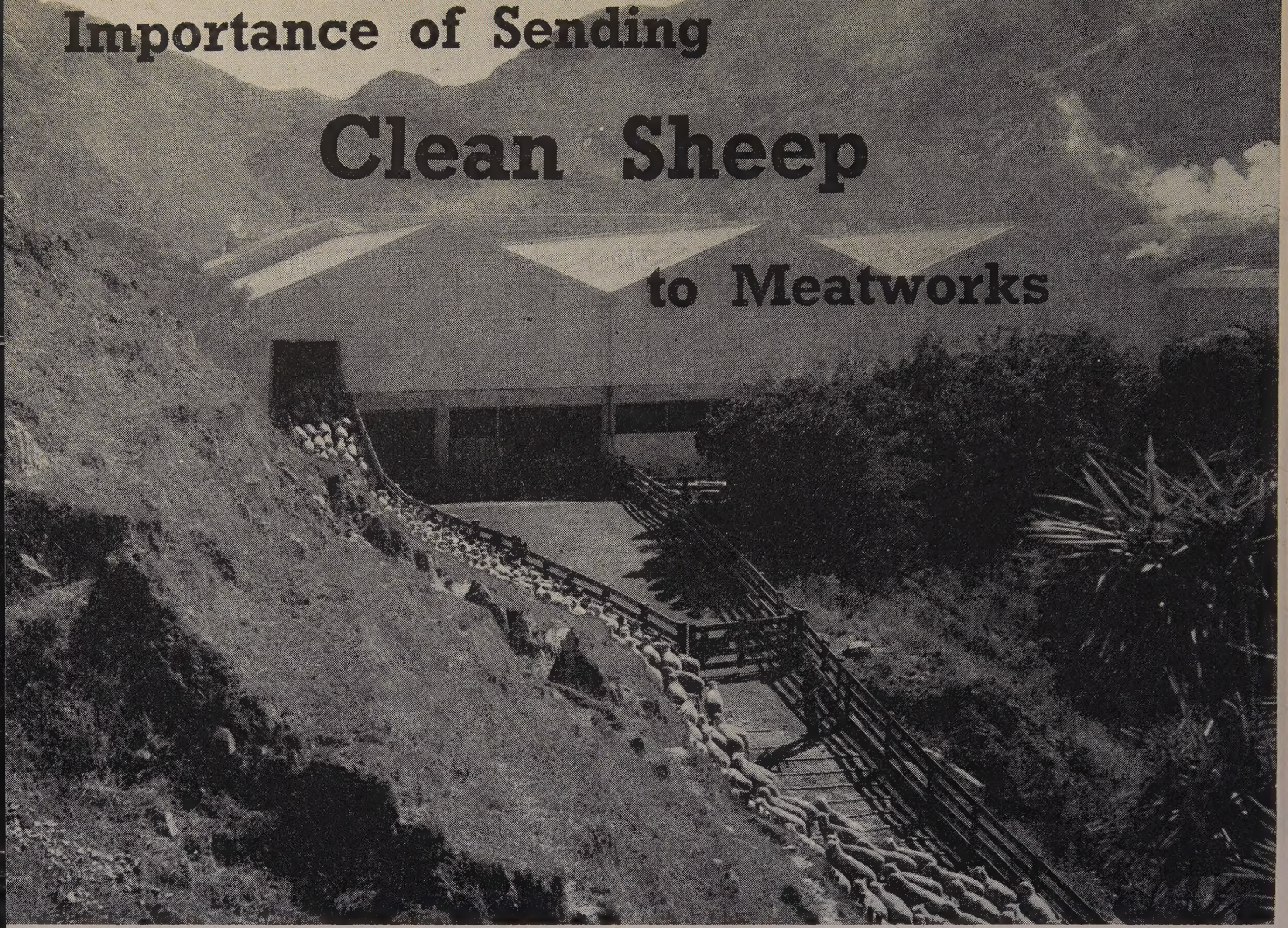
Importance of Sending Clean Sheep to Meatworks



SINCE the war land development and improvement of pastures have led to a large increase in the sheep population and in exports of sheep meats, especially lamb. The traditional market in the United Kingdom cannot absorb all the extra mutton and lamb. Numerous meat-exporting interests are searching for new markets for this surplus. The North American continent is one area which offers promise. This article on sending clean stock for slaughter deals with the problem of daggy sheep and how it is likely to become aggravated as more flock owners divert their attention to this new market. It points out why the responsibility of sending clean sheep and lambs to the works must be placed on the farmer and that the stock carrier has a responsibility to keep clean stock clean once they are in his charge.

By E. NELSON,
Livestock Instructor,
Department of Agriculture,
Papakura

EXTREMELY high standards of hygiene are set by all countries importing New Zealand meat. Within the meat industry every effort is made to keep meat from slaughtered stock clean. Safeguards are taken at every stage of the process from the time the stock enters the slaughtering premises until the final packaging. Naturally stock must be clean before slaughter.

A system of showers removes from cattle any dirt which might otherwise be carried into the slaughterhouse, but water showers cannot be used for sheep and lambs. They are quite ineffective in removing dirt and dags from them. Moreover it is essential that the wool of the sheep should be dry during the entire dressing process.

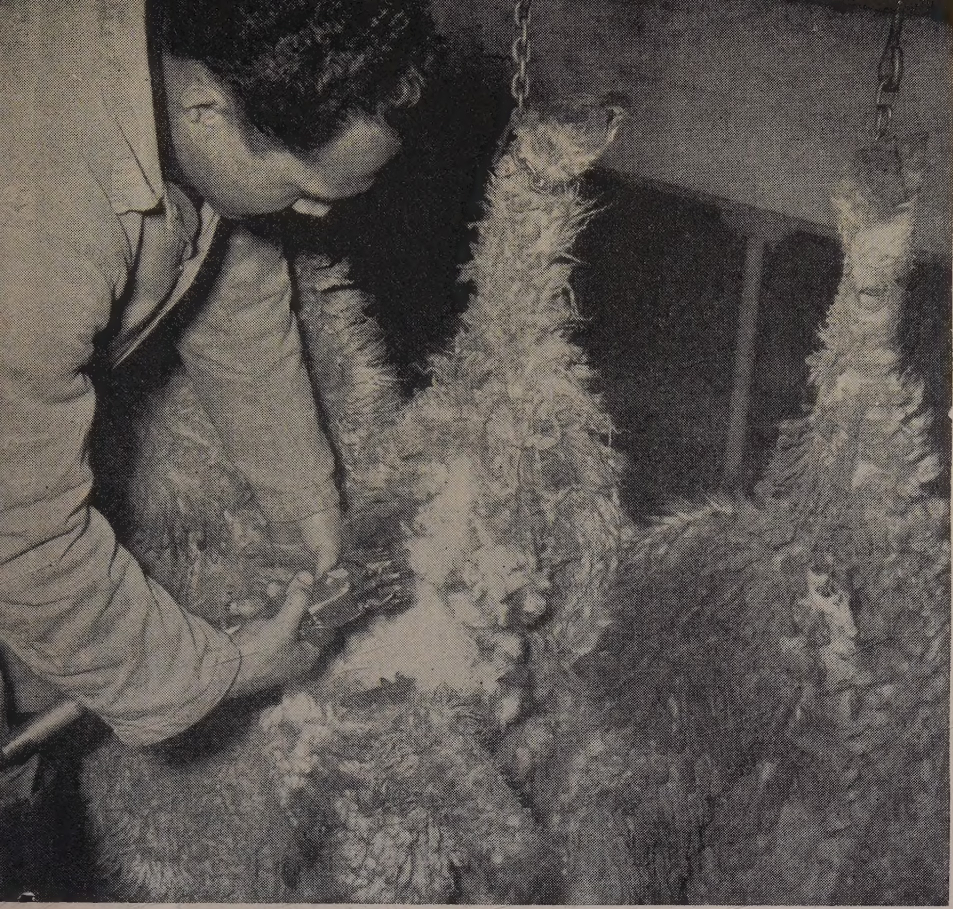
Farmers who kill for the household will readily appreciate the difficulty of keeping a carcass clean when the sheep has a dirty and wet fleece of long wool. People who peel potatoes without first washing off the dirt experience the same kind of difficulty. Like the dirty potatoes in among the clean ones, daggy sheep in a small yard or truck can foul the wool of clean ones. Should they become wet, the situation becomes worse.

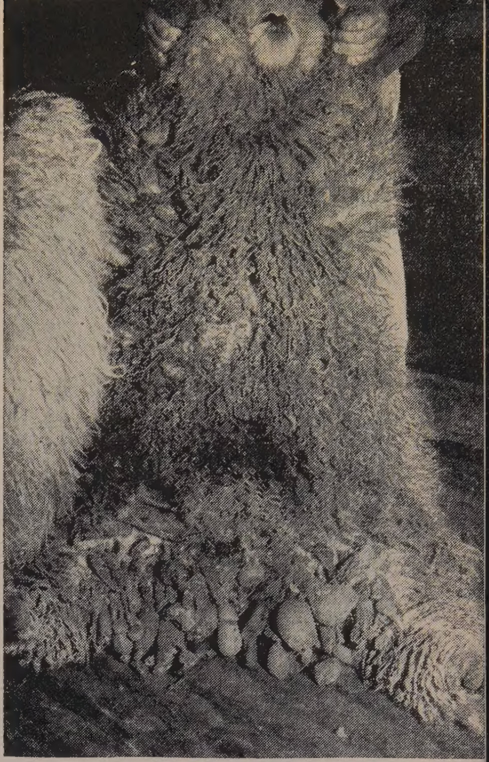
It is standard procedure at all slaughterhouses to dag dirty sheep before skinning, but so far the meat industry has no method of dealing with sheep and lambs with dirty fleece wool. This is and must necessarily remain the responsibility of the farmer. It is his job to see that sheep and lambs leave his farm clean.

Store Lamb Problem

For many years New Zealand has supplied the United Kingdom market with light, 3- to 4- month-old Romney-Southdown cross lambs. The killing season for these lambs has been in the summer months of December, January, and February. For the greater part of their short lives these lambs graze on dry, fibrous pasture. No great problem with wet dags is experienced and their short wool carries little dirt.

However, those lambs which fail to make good bodyweight gains are necessarily carried over into autumn and winter as stores. When the general





▲ Rather than send sheep to the works in this condition consideration should be given to having them shorn.

← These daggy sheep should have been cleaned up before dispatch to the works.

rains start in March pastures become green with renewed growth of ryegrass. These lambs are liable to become daggy on this moist and succulent feed. About this time in early autumn the young sheep become infested with internal parasites and in the succeeding autumn and winter months they can become very daggy. These lambs present a problem to the meat-export works. When an inconsiderate farmer sends in a line of long-woolled, wet, and daggy lambs in late autumn or winter it may take a long time before they are suitable for slaughter.

Daggy Sheep and Lambs

The degree of dagginess is affected by the type of country being grazed. On extensive hill country where pasture contains a dominance of the more fibrous native grasses, the faeces tend to remain firm throughout the year. On country of this class daggy sheep are not usually a problem. When summer shearing of lambs is practised it is normally sufficient to go through the hogget flock occasionally to clean up an odd one which may be dirty.

On improved country, where hogget faeces are inclined to be soft or very soft, the problem of dags is largely one of fibreless feed. The build-up of worm population in March, April, and May can aggravate this situation still further. Monthly worm drenches during this period are worth while, but the main control should be on lines designed to keep the faeces firm. This can be done best by grazing hoggets on mature pasture about 4 to 5 in. high and providing hay.

Long and Dirty Wool

In winter unshorn lambs in muddy paddocks and yards become very dirty about the brisket and belly. Farmers who supply sheep to the meat-export works could help the industry by keeping the fleece wool of these sheep at a reasonable length. One inch of wool is a good standard. In cold, wet districts store lambs do much better if they are shorn after weaning.

Lines of ewes which have been shorn during the previous December are also troublesome at the works if they are muddy when forwarded. It is common practice by use of raddled rams to pick out dry ewes and late lambing ewes. Sometimes these ewes are sent to the meatworks for slaughter in the wet months of May and June. Rather than send them to the works dirty, consideration should be given to having them shorn. In addition to the difference between the price for the wool shorn and that received for the wool on the pelt, the farmer would be guided in making a decision by the length of wool and the ground conditions.

Crutching and Dagging

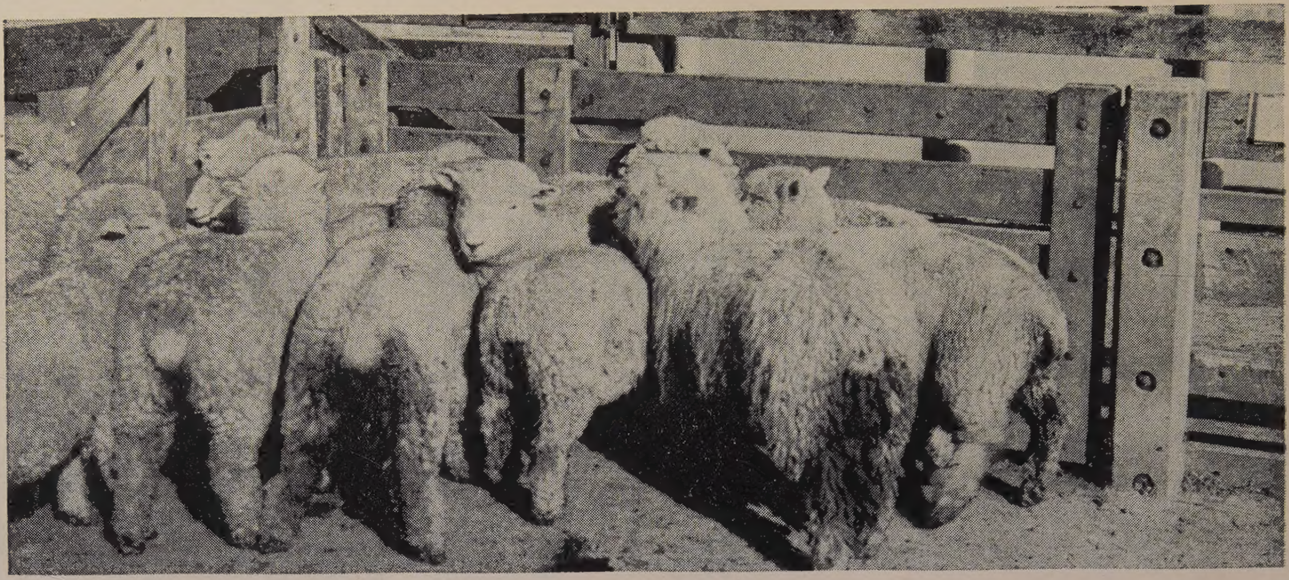
Butchers at meatworks may receive serious knife injuries if newly shorn or crutched sheep are sent to the meatworks. They should not be forwarded for slaughter with less than 3 weeks' growth of wool. A half inch of wool is the minimum length considered safe and acceptable to butchers.

Within the meat industry the term "to dag" means to remove dags and dirt only. When dagging is done at the meatworks as little wool as possible is removed. The reason for this is to allow the knife workers sufficient wool to grip when opening up the legs. The removal of all the crutch and leg wool, as in an exaggerated crutching, makes this part of the skinning process extremely hazardous. Farmers should remember this when dagging sheep or lambs shortly to be sent to the works. Obviously, extremely daggy sheep cannot be cleaned up and dispatched immediately.

Only by constant attention throughout the year can sheep be prevented from becoming daggy to a degree where exaggerated crutching is required.

Stock Trucks

A carrier engaged to carry sheep that are wet and daggy cannot be expected to deliver them in any other condition, but if the farmer presents the carrier with perfectly dry and dag-free sheep, he has a moral responsibility to get them to their destination



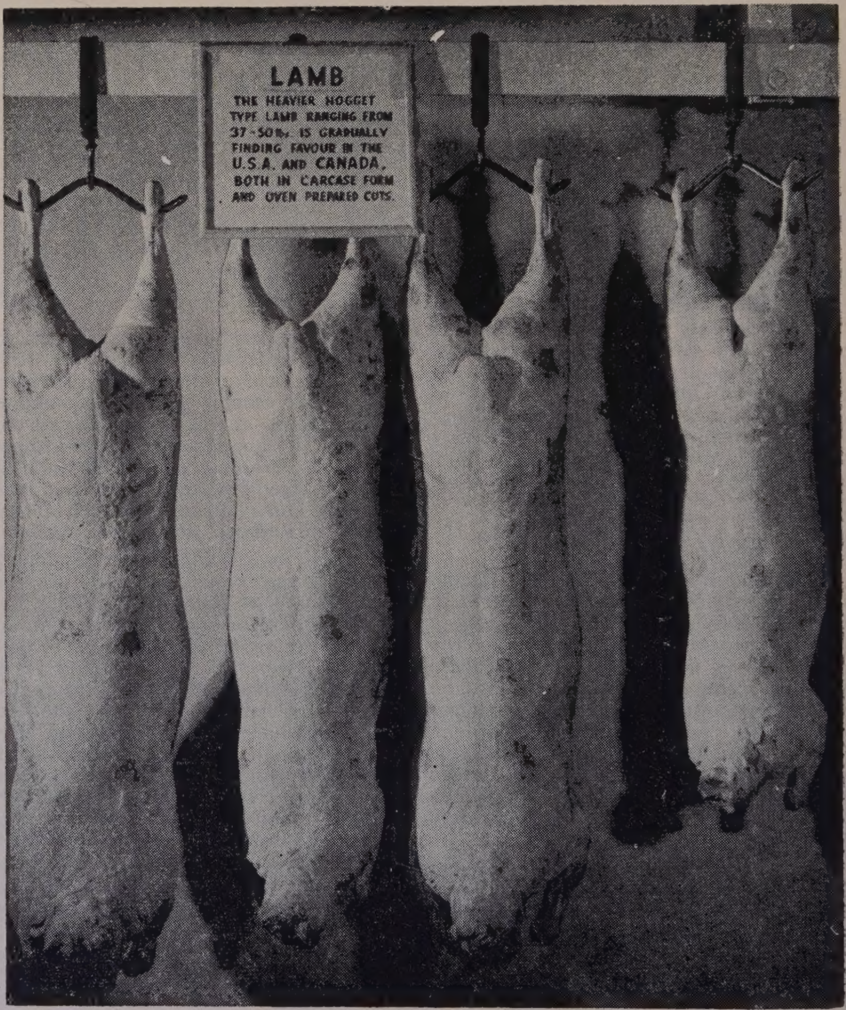
▲ Even a few daggy sheep among a line in a small yard or truck can soon foul the wool of clean ones.

in good killing condition. A well designed and constructed crate is essential. It is equally essential that the crate should be kept clean. All progressive meat-export slaughter-houses have washing-out bays with high pressure hoses. The onus is on carriers to make use of them.

Double-deck Sheep Crates

It is most important in construction of double-deck sheep crates that a waterproof roof should protect sheep in the lower deck from being fouled by sheep carried on the upper deck. Often on quite a modern vehicle the roof on the lower deck is in a poor state with the result that on a long trip sheep in the lower deck become very wet and dirty.

All sheep wagons used by the Railways Department have a convex in-between roof made from tongued and grooved boarding. The railways have built up a fine reputation for


LAMB
THE HEAVIER HOGGET TYPE LAMB RANGING FROM 37-50 lb. IS GRADUALLY FINDING FAVOUR IN THE U.S.A. AND CANADA, BOTH IN CARCASE FORM AND OVEN PREPARED CUTS.

There are prospects for expanding sheep meat sales to North America, where the preference is for heavier lambs such as the three shown (with a light carcass at right for comparison). Should the market for heavier lambs grow, lambs will have to be carried through and killed in late autumn and winter, and much greater care will be needed to get these lambs to the works clean than with lambs drafted early in the season. →

All progressive meat-export slaughterhouses provide washing-out facilities for stock trucks. Carriers should make full use of them.

transporting sheep in New Zealand. Rail transport is used extensively for long journeys and carries the larger part of the total of all sheep killed at the major meatworks.

Farmer-owned Stock Trucks

Many farmers and stock dealers own stock trucks. Unfortunately, when they want to carry sheep few of them can replace the cattle deck with a sheep crate. Sheep and lambs are often brought in to the works or saleyards in a dirty cattle truck.

Conditions underfoot in cattle trucks are generally unsuitable for sheep, particularly if trucks are wet and dirty from previous loads of cattle. Even on very short trips sheep are liable to lose their footing and their fleece wool becomes extremely dirty.

Full Paunches

At most slaughterhouses there are fairly extensive provisions for keeping sheep under cover. It is important that sheep should be dry during skinning. By use of these shelters sheep can be kept moving into the slaughterhouse without loss of time due to stoppages caused by wet wool. There is another reason for these holding facilities: By withholding slaughter for 24 hours after cattle or sheep have been feeding a big reduction in paunch contents and size is achieved. This is an important part of hygiene. An over-full paunch when being removed can lead to staining of the carcass.

Farmers should yard sheep and lambs the evening before they are to be loaded. By doing this not only will they be assisting to prevent paunch staining but much fouling of wool which comes about when full sheep are trucked will be avoided. During wet weather sheep so yarded should be held under cover. Ample drinking water should be available during this emptying period. Sheep and cattle on long journeys to meatworks should be off loaded every 24 hours and fed hay as well as having access to drinking water.

North American Lamb

The lamb required by the North American area is heavy and lean. Too much fat is undesirable. The preference to date has been for carcasses of between 37 and 50 lb. The Romney-Southdown cross lamb at this weight is too fat. Whether this lamb is produced from pure Romneys, Romney-Cheviot cross, or Border Leicester-Romney cross is secondary to the fact that to achieve these heavier weights lambs must be killed much later than those destined for the United Kingdom market.

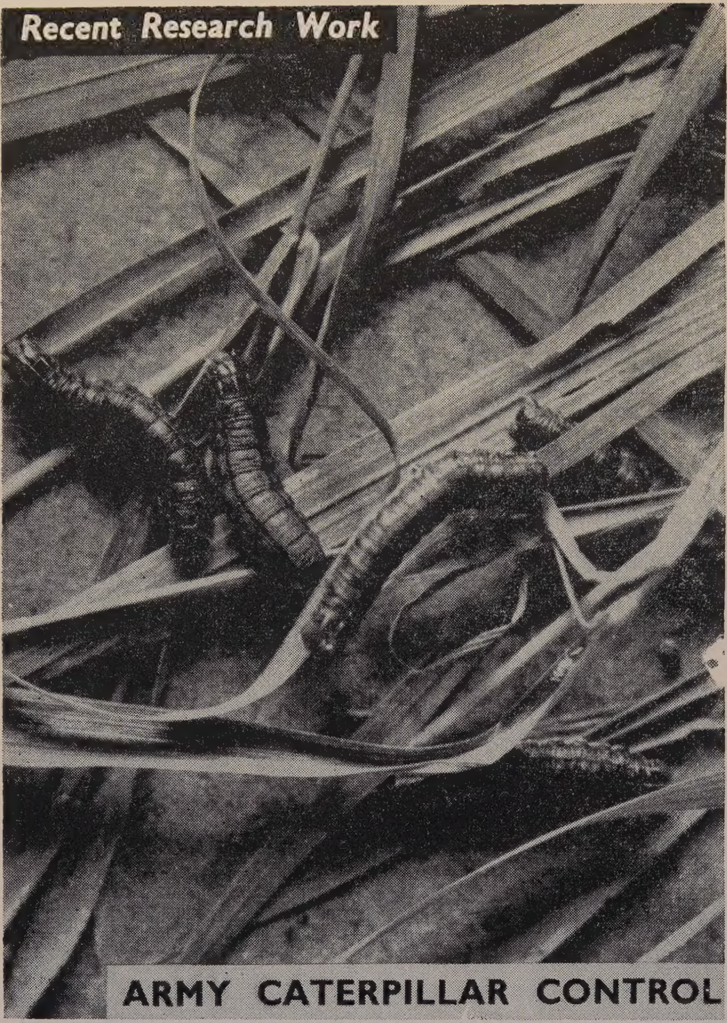
With late autumn and winter killing the problem of getting hoggets to the meat-export works clean will increase should this new market grow. This means added responsibility for the farmer. Extra effort will be needed to assure that the slaughtermen have only clean lambs to handle.

Points to Watch

The important considerations for sheep and lambs sent to meatworks are:

1. Daggy sheep and lambs foul one another during the journey and this is aggravated if the wool is long or wet. The carcasses of such sheep are difficult to keep clean.
2. Muddy yards should be avoided. Daggy sheep should be cleaned up.
3. Newly shorn or crutched sheep should not be sent to meatworks until sufficient wool has grown to make handling of them safe.
4. Sheep trucks should be well designed. The in-between roof on double-deck trucks should be in good condition and waterproof. Only clean trucks should be used.
5. Sheep and lambs should be emptied by yarding the night before dispatch to the works.
6. Stock transported long distances should be off loaded every 24 hours and fed on hay and have access to drinking water.

Recent Research Work



ARMY CATERPILLAR CONTROL

IN recent years farmers have taken increasing interest in pests of various types which cause damage to farm crops. This is probably due mainly to the ability now to combat these pests with new and improved insecticides and possibly also to farmers having equipment for and experience in large-scale spraying through such widespread adoption of chemical weed control. Ten years ago few farmers would have considered spraying of large areas of crops practical or economic. Farmer interest in pests has been heightened in the last 2 or 3 years by the severe infestations of various pests which have occurred as a result of seasonal conditions favourable to their development. One of these pests, the army caterpillar (*Pseudaletia separata*) or army worm, as it is often called, has caused considerable damage to pastures and crops during the last few years. Toward the end of last year the Department of Agriculture in conjunction with the Entomology Division of the Department of Scientific and Industrial Research planned experiments and arranged for trials to be carried out if outbreaks of army worm should occur. One of these trials was carried out in the Warkworth district on an area of kikuyu grass which had been completely bared of foliage by a moderately heavy infestation of army worm. Some interesting results from the experiment are presented in this article.

AN infestation of army caterpillars consists of large numbers—70 per square foot and more have been recorded—of vigorous caterpillars with almost insatiable appetites. Such a horde quickly defoliates any plants in the area and then moves on for further nourishment. Pastures are the most commonly attacked crop and maize is also frequently damaged.

THE EXPERIMENT

Treatments were applied on 1 April 1958 and the trial was completed on 9 April 1958. Two insecticides, DDT and dieldrin, were applied as sprays in water and as dusts in superphosphate. As sprays the two materials were applied at the equivalent of ¼ and ½ lb. of pure chemical per acre and as dusts at ½ and 1 lb. in 2½ cwt. of superphosphate per acre. Assessment of treatment effects was based on results of counts of caterpillars taken immediately before and at various intervals after application of treatments. Counting was carried out on areas each of 1 square link (approximately 8 x 8 in.), several of which were counted on each occasion. In the counts taken after application of treatment separate tallies were kept of caterpillars dead, affected, and unaffected.

RESULTS

Good kills were obtained on all plots treated with insecticide, which was reflected in remarkable recovery of the kikuyu grass on them. Seven days after application of treatments all plots treated with insecticide had recovered and were a bright green whereas untreated plots remained brown and completely devoid of leaf. Though this pasture response did not reveal any differences between DDT and dieldrin, some significant differences were apparent when results of counts were analysed, as the following table indicates.

COMPARISON OF PERCENTAGE OF AFFECTED AND DEAD CATERPILLARS AT VARIOUS TIMES

	Interval after application of treatments		
	1 day	2 days	7 days
Dieldrin	83	88	97
DDT	47	55	85

Dieldrin gave a much more rapid kill than DDT and even after 7 days DDT, though giving satisfactory results, was still inferior. There were no significant differences between the various rates of dieldrin and DDT used and method of application—spray or dust—though the dusts were applied at heavier rates than the sprays.

PRACTICAL APPLICATION OF RESULTS

Army caterpillars when present in large numbers can very quickly defoliate pasture. Therefore early discovery of infestations and prompt treatment are extremely important. In this respect the results of the trial showed that dieldrin is more efficient than DDT, particularly as dieldrin gave a much better kill during the first 24 hours. However, it is quite possible that the caterpillars affected with DDT cease feeding within a short period, though they may take much longer to die.

Based on this trial a rate of application equivalent to 4 oz. of pure dieldrin or DDT in water per acre or 8 oz. per acre as a dust appears to be adequate. Unfortunately there was no treatment with 4 oz. of pure insecticide applied as a dust. It is quite possible that this rate may be effective, but further experiments are required to check this point.

—*C. M. BLICK*

Heading photograph by Department of Scientific and Industrial Research.

FACIAL ECZEMA

Precautions and Warning System for This Season

BECAUSE some confusion existed last year concerning the method of forecasting periods during which facial eczema was likely to occur, this statement has been prepared by the Departments of Agriculture and Scientific and Industrial Research and is issued with the full backing of both Departments. It describes the basis of assessment of likelihood of outbreaks and the system of issuing of warnings.

THE discovery that a fungus can cause the characteristic lesions and symptoms of facial eczema has naturally led to the hope that some simple method of controlling this fungus will be devised and that facial eczema will thereby be prevented.

Plans have been made to study the fungus in the field with a view to determining its exact relationship to the occurrence of facial eczema. Investigations will be undertaken in both the laboratory and the field to find the best method of controlling the fungus.

It is, however, most unlikely that any new methods of controlling facial eczema will be available before next autumn. Farmers should not use fungicides until it is known that they are both effective and safe, neither of which has yet been demonstrated.

Should dangerous conditions occur next autumn, farmers will have to rely on the effective though unpopular methods of grazing on safe crops or shutting up at a rate of 200 or more sheep per acre and feeding hay.

Warnings by Committees

As was done last year, warnings will be issued by the chairmen of District Committees comprised of officers of the Department of Agriculture and farmer representatives. The warning system will be based on the knowledge that facial eczema is more likely to occur in years which are hotter than normal, and in such years the grass becomes toxic after warm autumn rains. The probability that the liver-damaging substance is produced by a fungus does not alter this situation.

In the assessing of the likelihood of facial eczema the following temperatures are taken into account: air maximum, air minimum, grass minimum, 4 in. soil temperatures. These are taken under carefully standardised conditions at a number of strategically placed official weather-recording stations. The importance of standard conditions is emphasised, because temperatures taken with thermometers exposed under varying conditions are quite useless for assessing the danger of facial eczema.

Defining Hot Weather

Where daily temperatures have been continuously recorded for not less than 10 years at a weather station the average temperature for each week can be calculated for that station and, from this, the deviations from normal are obtained. From 1 November to 30 April these deviations are calculated every Monday by the Weather Office in Wellington for the week ending 9 a.m. that day for 11 carefully selected weather stations. They are forwarded the same day to all offices of the Department of Agriculture in districts in which facial eczema is known to occur.

There has been some criticism because weather records are not used from more centres. This is not done for three reasons: in some cases continuous recordings are not available over a sufficient period to enable

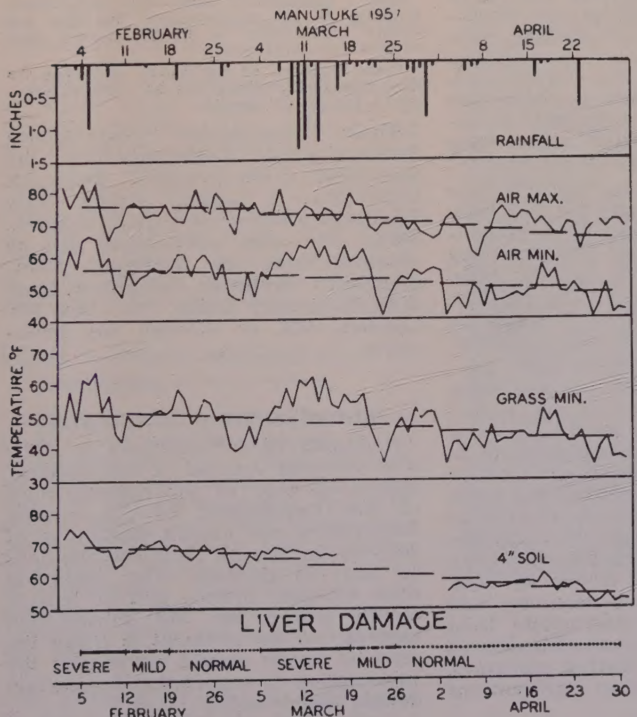


Fig. 1.

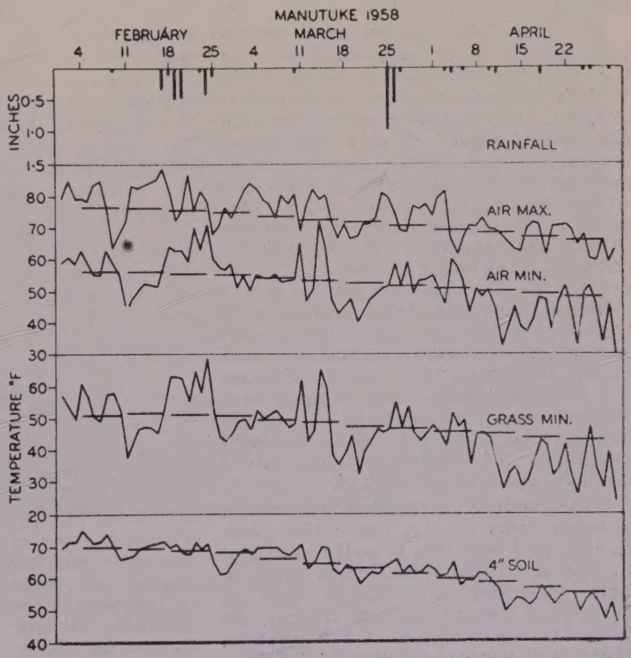


Fig. 2.

FACIAL ECZEMA PRECAUTIONS . . .

accurate averages to be calculated; in some cases it is not possible to make the weekly deviations available rapidly; records show that temperatures deviate in the same direction over wide areas—in some cases over the whole of New Zealand.

Where temperatures are above normal the likelihood of facial eczema is increased, and farmers are warned to be ready to take precautions if warm rains fall. It is not necessary for temperatures to be above normal for long periods, and any warm autumn rains which cause a visible response in grass growth should be regarded as dangerous. Precautions should always be taken after ½ in. of warm rain has fallen.

Fig. 1 shows how liver damage can follow warm autumn rains. It is based on data collected from the Department of Agriculture's Experimental Station at Manutuke, where the relationship of weather to liver damage has been studied since 1944. The short horizontal lines indicate the average temperatures for each week and it can easily be seen how the 1957 temperatures varied above and below these averages. At Manutuke groups of lambs are introduced into the experimental paddocks every week from the end of January until late April. After 3 weeks each group is removed and killed and the livers are carefully examined. In addition, pasture is collected and dried every day and samples are fed to guinea pigs. It is thus possible to define the periods during which liver damage occurred. The bottom line in the figure indicates that the warm rains in both February and March initiated such dangerous periods.

The Manutuke studies have shown that liver damage can occur without the development of skin lesions. In 1957 no such lesions occurred in February, but some lambs showed them in March. However, nearly all lambs which grazed continuously from January to April had badly damaged livers when killed at the end of that period. A similar situation occurred in the Waikato in 1958. Though no outbreaks of facial eczema were reported, a large percentage of sheep killed at the meatworks showed varying degrees of liver damage. Such sheep are particularly sensitive to the effects of toxic grass, and in addition are likely to break down under special stresses, such as lambing. It is not enough to prevent the outward symptoms of facial eczema; liver damage must be prevented.

It is well known that all warm autumn rains do not cause the grass to become toxic; this is well illustrated in Fig. 2. Though the warm rains in both February and March 1958 at Manutuke caused pasture flushes, no liver damage occurred. Unfortunately, there is at present no way of differentiating between warm autumn rains which are followed by liver damage and those which are not.

Some publicity has been given to a system for predicting dangerous periods which is based on grass minimum temperatures and the degree to which these approach air maximum temperatures. In this system pasture is said to become dangerous if two successive grass minimum temperatures of 53 degrees or over are associated with ½ in. or more of rain, especially if the grass minimum and air maximum temperatures on the same day are not far apart. Since 1945 there have been 36 occasions at Manutuke on which two successive grass minimum temperatures of 53 degrees or over during autumn have been associated with ½ in. or more of rain. In 12 of these periods liver damage occurred. The smallest difference between grass minimum and air maximum temperatures varied from 2.4 to 16.7 degrees with an average minimum difference of 8.4 degrees. In the other 24 periods no liver damage occurred. In these the minimum difference between grass minimum and air maximum temperatures varied from 0.5 to 15.1 degrees, with an average minimum difference of 7.7 degrees. It is thus obvious that this system does not differentiate between dangerous and harmless warm autumn rains.

The Beaker Test

Chemical investigations at Ruakura Animal Research Station have shown that a test known as the beaker test is of some value in detecting toxicity in pasture. This test will be used experimentally during the coming autumn in some districts and information obtained from it will supplement weather data in predicting dangerous periods. The test is, however, not sufficiently accurate to be used as the basis of a warning system in all districts.

Studies are being continued in the field and in the laboratory with a view to increasing the accuracy of predicting dangerous periods and providing improved methods of preventing facial eczema. During the coming autumn, however, farmers will have to rely on the methods which have been recommended during recent years.

District warnings will indicate when conditions are likely to become dangerous, but each farmer must decide for himself when to take precautions. These should be started as soon as warm autumn rains fall on his farm. Because of this, farmers should have their own rain gauges. Temperature deviations do not vary widely within a district, but rainfall frequently does. Thermometers are not necessary and may give misleading information. Rain gauges are essential and, when used in conjunction with district warnings, indicate clearly when precautions should be taken.

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Recent Developments in

Processing Honey for Soft, Smooth Grain

A NEW type of honey agitator designed by the author to improve the spreadability of honey and also produce a very smooth-grained texture in the product is described in this article by C. R. Paterson, Apiculturist, Department of Agriculture, Hamilton. This machine was first demonstrated 2 years ago, and trials since then have given definite results provided certain procedures are followed.

THE best way to eat honey, as directly stored by the bees, is in the natural honeycomb. However, commercial beekeeping has been built up on the production and sale of honey removed from the beeswax comb. This is done by extracting the crop of honey by centrifugal force from the combs in which the bees store it.

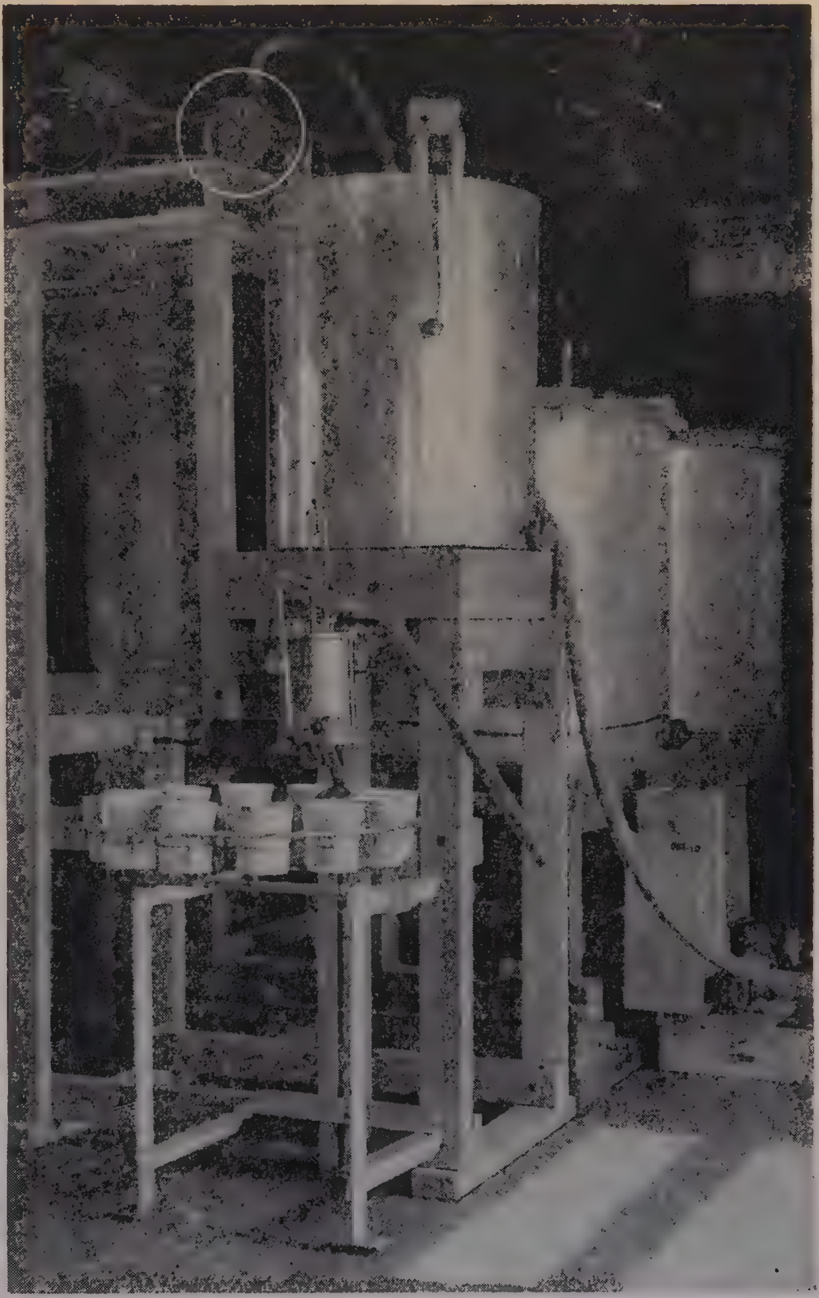
Most honey, if left for a few weeks after extraction, would soon begin to granulate and in a month or so would go quite sugary. The average consumer of honey does not like it in this condition, so competent beekeepers process their honey to prevent these coarse sugary crystals from forming. There is no secret in this process, as it is simply a matter of temperatures, the addition of a small amount of really smooth-grained honey (starter), and adequate stirring. Nothing else is added because it is not necessary to do so.

All honey contains a certain amount of water which varies according to climatic conditions, the district, and the kind of flowers the bees are working. The maximum safe amount in New Zealand honey is 17.2 per cent, yet in some areas the amount may be as low as 15 per cent. The water content of honey has a direct bearing on the general condition and its reaction to any processing method.

Faults in Present Methods of Granulation

1. Honey with a low water content of the type usually produced in the warm, dry districts of New Zealand, usually sets very hard after granulation. In this condition it is very difficult to spread and many spoons have been bent and many knives broken in trying to get this kind of honey out of its container. Housewives are very reluctant to buy honey like this if something softer and more spreadable can be found.

2. Unless great care has been taken in the handling of the honey during



A honey creamer (in circle) incorporated into a set-up normally packing honey with a low water content. The pump which lifts the honey to the creamer is at lower right.

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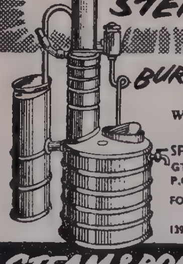

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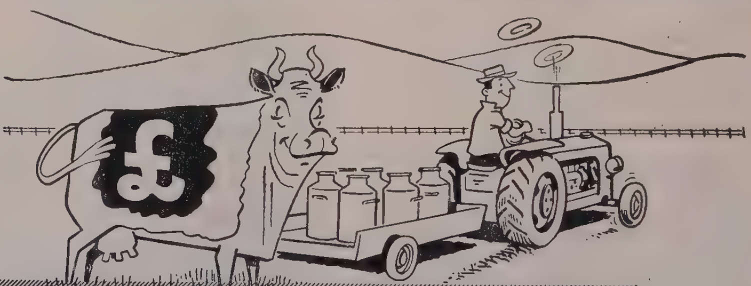

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packing, white streaks often show up very prominently after storage for a month or so. This is known as dry granulation, and though it does not affect the quality of the honey as a table delicacy, it certainly detracts from the general appearance of the product.

3. Supplies of starter honey have to be kept for the season's packing. In some instances starter honey is carried over from the previous season, and very often by the time it is used is not in the best condition.

4. In many instances normal stirring methods do not give this very smooth texture to the honey because temperatures are not right. This is why it is so difficult to produce a smooth-grained honey during the warm, summer months unless practical methods are used in reducing the temperature of the honey during the granulation process.

Methods Tried

Experiments were carried out to see if present methods of processing honey could be improved.

It was known that stirring of the honey was important in granulation, so some time was spent in analysing the possibilities of improving on the various types of stirrers in use. However, a larger machine and a more powerful motor could not be considered because of cost.

High-frequency vibrations at first appeared to offer possibilities, but here again the high cost of an installation eliminated this method for practical use.

As honey pumps are now almost standard equipment in most honey houses, it was thought that they could be used to give the honey that extra agitation. Several plates with very fine holes were placed on the delivery side of a honey pump. It was thought that if semi-granulated honey was taken from the processing tank by the pump and then forced through the series of small openings, a general break up in the texture of the honey would be attained. Trials with this method gave a definite improvement in the texture of the honey compared to that of the control samples.

While these experiments were being carried out the author thought of subjecting a small amount of honey to severe agitation on the same principle as the standard stirrer. Because of the small amount of honey in the unit a much higher speed could be used while still making use of a smaller powered electric motor.

In the first trial the agitator unit was attached to an open 60 lb. honey tin. Liquid honey was placed in the tin and 5 per cent starter was stirred in to the honey with a stick. Next day some honey was run through the machine and a sample compared with the control. Practically no difference could be detected in the two samples. Results were very similar for the next 3 days. After this a decided change could be noticed. When the honey in the tin was so firm that it had to be moved away from the sides of the tin by a stick, the final sample came out like thick cream.

A comparison of all samples several weeks later seemed to indicate that the small agitator method offered the best prospects for a general improvement in creamed honey. Also the method was simple and could be worked as an "in-line" unit when packing, and the cost would be reasonably low for its installation.

Further trials showed that air could be injected under control, and the result was a very desirable type of starter honey.

Results of Trials

The checking of many samples run through this agitator or creaming machine gave the following results:

1. The machine must be run at a high speed, 750 to 850 r.p.m.

2. No definite results are obtained until the honey to be processed has reached an advanced stage of granulation, that is, will just run into the machine.

3. Honey with an exceptionally low water content requires more agitation, which can be attained by running the honey through at a slower rate.

4. Honey assumes a creamy, buttery texture and never sets brick hard.

5. Owing to the friction created during agitation a temperature rise of from 5 to 8 degrees F. can be expected.

6. This warming of the cold honey allows it to be easily packed into the various-sized containers without showing any of the streakiness so often seen in honey packed in an advanced stage of granulation.

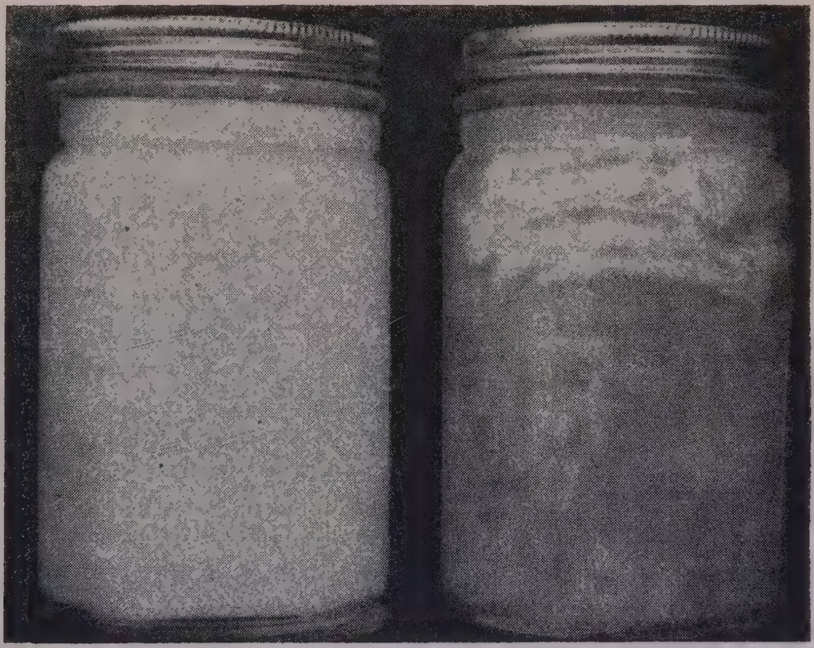
7. The honey settles down evenly in the container and offers a smooth top surface when the lid is taken off the package.

8. Though dry granulation has often shown up in the control samples, none has ever been noticed in any samples from the agitator.

9. Because of the severe agitation of the honey in this unit its general structure must undergo some change, because honey so treated is less hygroscopic. This honey when placed in a dish for table use does not appear to absorb moisture to the same extent that ordinary honey would do under humid conditions.

10. Honey when run through very slowly with the admission of a small amount of air makes ideal starter honey, which has the ability to mix readily into cold honey and at the same time hasten granulation. This is no doubt due to the increased number of fine crystals.

11. Smears of honey checked under a microscope have shown that crystal formation is completely broken up. However, this unit will not break



The honey on the left has been through the honey creamer, and that on the right, showing dry granulation, has had normal stirring.

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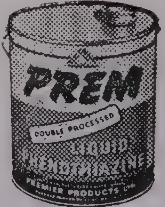

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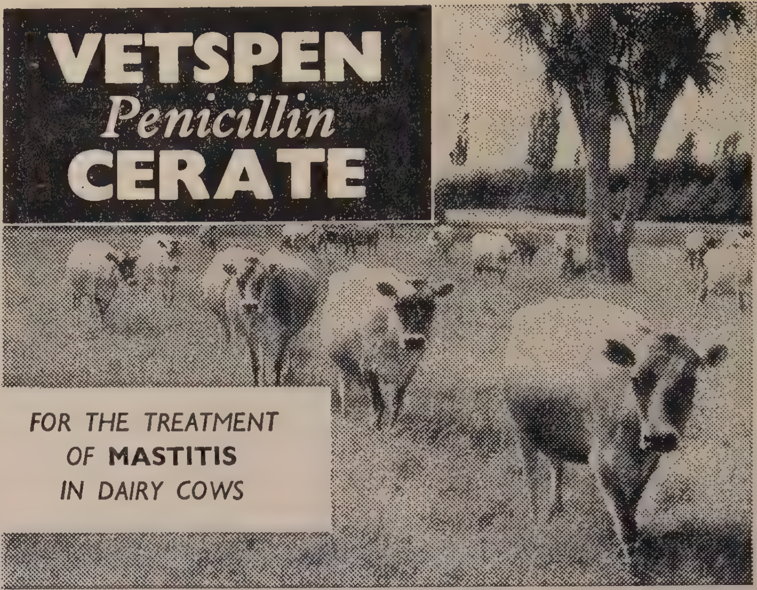

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down strong crystal formation because it has a limited abrasive effect.

Another important factor is the popularity shown by honey eaters for this type of processed honey.

12. Satisfactory results will not be obtained if the honey is too warm. Honey temperatures around 65 degrees F. are desirable.

Installation of Agitator

A 1 h.p. electric motor is required to drive this agitator.

As the speed of the agitator shaft is about 800 r.p.m., the pulley on the motor should be 3½ or 4 in. in diameter. This gives a pulley with a reasonable amount of belt grip.

For honey with a normal water content the machine can be coupled to the underside of the stirring tank and then on to the filling machine as shown in the drawing at right. The motor is controlled with the same switch as is used for the filling machine. However, arrangements should be made so that it can be operated separately when starter honey is being specially processed.

A set-up recommended for dealing with honey of a low water content is shown in the photograph on page 513. Here the honey is taken from the stirring tank by a honey pump and then through the agitator, which rests on top of a small holding tank. The filling of containers is done from this tank, and the level of creamed honey can be controlled by an automatic switch which controls both the pump and the agitator.

Operating Instructions

Because honey varies greatly in composition and water content, it is not possible to give a standard method of processing it with this type of agitator. Each beekeeper will have to develop a set-up most suitable for his own requirements.

The essential operating features are:

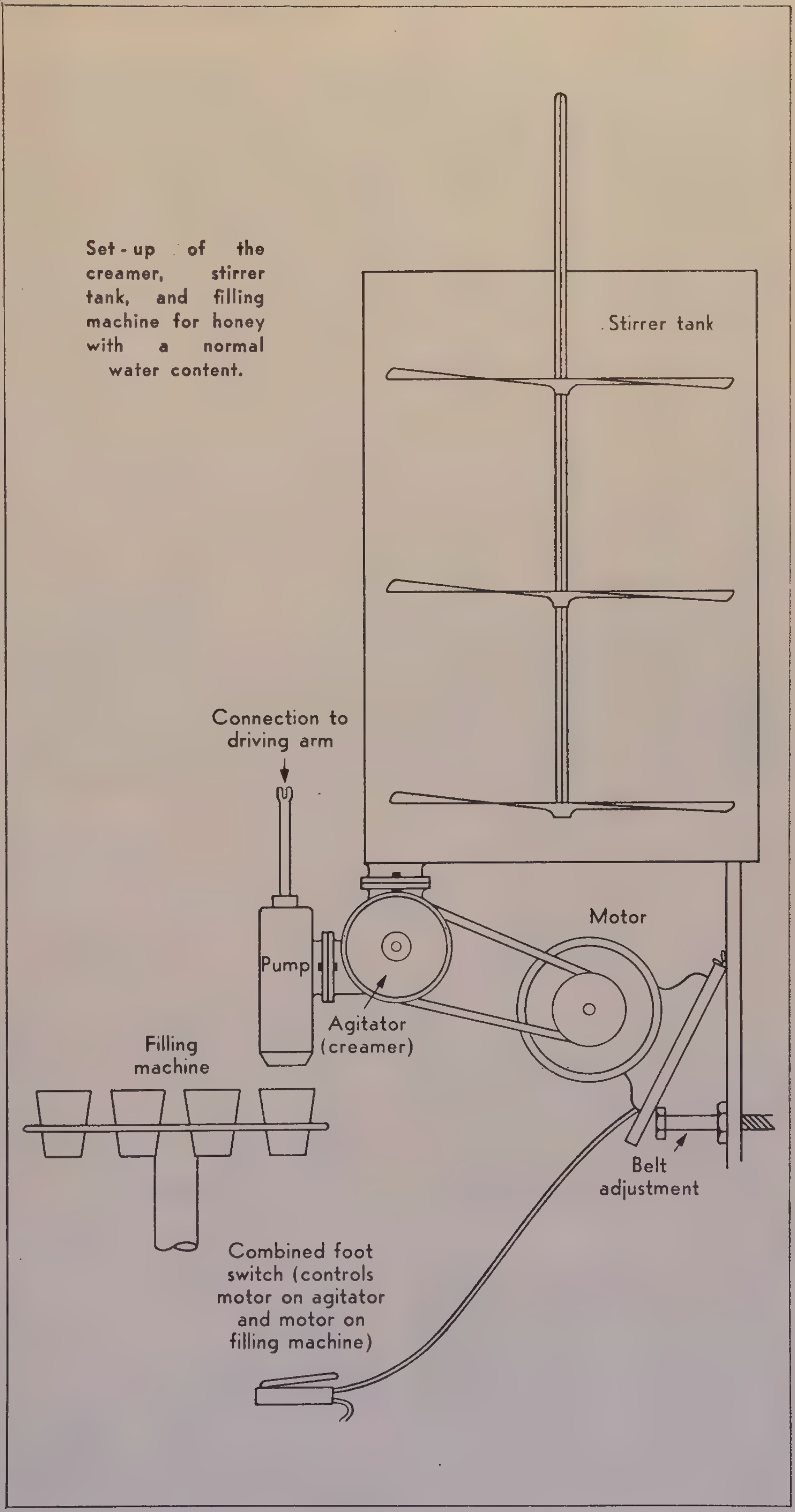
1. Assist initial granulation by adding about 5 to 10 per cent good, smooth-grained starter and then give the required amount of stirring.

2. Do not attempt to cream honey until granulation is well advanced and the honey will just flow.

3. The rate of flow through the agitator will have a direct bearing on the consistency of the honey.

4. This rate can often be increased by adding more of this specially creamed honey as starter. In fact several beekeepers are finding that they can turn out an improved pack simply by using the agitator for the processing of starter only. Because of a plentiful supply of starter much more can now be used, 15 to 20 per cent.

5. Do not attempt to cream warm honey. Temperatures around 60 to 65 degrees F. appear satisfactory.



Set-up of the creamer, stirrer tank, and filling machine for honey with a normal water content.

Stirrer tank
Connection to driving arm
Motor
Pump
Agitator (creamer)
Filling machine
Belt adjustment
Combined foot switch (controls motor on agitator and motor on filling machine)

6. For a good, soft, creamy honey it is not necessary to allow entry of any air. However, experience will show if admission of air causes improvements. In many instances the amount of air incorporated in the honey is not as much as that mixed in by the many types of stirrers now used. If the creamed honey is occupying more space in the container than usual, too much air has been added.

7. Because of the severe agitation the honey is subjected to, pockets of air in the honey are broken up into very fine particles. This is what accounts for the non-appearance of dry granulation in the creamed honey.

8. Air intake can be checked by removing the control screw when the agitator is operating and placing a finger tip over the opening, when a definite suction can be felt.

9. To secure a supply of starter honey let the honey run through the agitator at a slower rate. Place the honey in a cooler for a day or so, when it can be used as starter for the next tank lot.

10. Because the temperature of the honey as it passes through the agitator is raised about 5 to 8 degrees F., it is best to place filled containers immediately in the cool room. Generally about 2 days is enough to allow sufficient set before the honey is sent out to merchants.

11. Do not run the agitator for long periods without honey; otherwise you may get excessive wear on the bearings. Also drain the machine after use, and before starting up again make sure the spindle is free.

This type of agitator is not a honey pump, but a machine designed to give honey the maximum amount of agitation or creaming in the shortest possible time.

In all experimental work it was found that a general improvement in texture was noticeable in tests carried out when the desired stage in granulation had been reached.

It has also been found that honey subjected to this creaming process did not break down under normal summer temperatures.

Construction

There is nothing complicated in the construction of this type of creamer or agitator, and it is understood that machines of this pattern are already being manufactured at a very reasonable price. Your local Apiary Instructor will be able to advise you where they are procurable, and further details on construction and installation can be obtained from the Apiculturist, Department of Agriculture, Hamilton.

Dr M. B. Buddle Appointed Superintendent at Wallaceville

DR M. B. BUDDLE, Senior Veterinary Research Officer, Department of Agriculture Animal Research Station, Wallaceville, has been appointed Superintendent of the Station in succession to Dr I. J. Cunningham.

Dr Buddle.

DR BUDDLE has an international reputation in research and has made outstanding contributions in the field of microbiology and animal disease.

Born in 1914 in Australia Dr Buddle graduated B.V.Sc. with honours in 1936 and joined the New Zealand Department of Agriculture in January 1938.

He was awarded a D.Sc. by the University of New Zealand in 1956 for a thesis describing outstanding work on a family of bacteria.

In 1953 he was awarded the first Underwood Fellowship granted by the United Kingdom Agricultural Research Council, which enabled him to undertake a year's research at the University of Cambridge on causes of one of the genital diseases in sheep.

For the past 5 years Dr Buddle has been leader of a section at Wallaceville engaged in research projects on bacteria causing animal diseases. He has directed investigations into blackleg and pulpy kidney of sheep and cattle, contagious abortion of cattle, epididymitis of rams, mastitis, Johne's disease, and salmonellosis.

His application of a vaccine to the control of contagious abortion in cattle was a major contribution to the dairy industry. To study developments in investigation of contagious abortion in particular and of other bacterial diseases of livestock Dr Buddle in 1946 visited research institutions in the United States, Canada, and the United Kingdom.

Dr Buddle's work on the causes and control of blackleg resulted in the development of a greatly improved vaccine. He also developed a new double vaccine for the control of epididymitis in rams. His eminence in this particular field of research was recognised by his being appointed to a joint FAO-WHO Expert Committee on Brucellosis.

Dairy Produce Graded for Export

THE following figures showing quantities of dairy produce graded for export during September 1958 and for the 2 months ended 30 September 1958 with comparative figures for the same month and the 2 months of 1957 have been compiled by the Dairy Division of the Department of Agriculture from figures supplied by divisional officers at the various grading ports:

BUTTER

Period	Creamery (tons)	Whey (tons)	Total (tons)	Percentage inc. or dec.
September 1958	19,902	268	20,170	—
September 1957	17,992	269	18,261	—
Increase or decrease	+1,910	—1	+1,909	+10.454
2 months ended 30/9/58	31,322	374	31,696	—
2 months ended 30/9/57	29,183	379	29,562	—
Increase or decrease	+2,139	—5	+2,134	+7.219

Butter in store at 30 September 1958 was 9,738 tons

CHEESE

Period	White (tons)	Coloured (tons)	Total (tons)	Percentage inc. or dec.
September 1958	5,417	1,328	6,745	—
September 1957	6,159	1,095	7,254	—
Increase or decrease	—742	+233	—509	—7.017
2 months ended 30/9/58	6,837	1,365	8,202	—
2 months ended 30/9/57	7,777	1,135	8,912	—
Increase or decrease	—940	+230	—710	—7.967

Cheese in store at 30 September 1958 was 8,946 tons

If these figures are converted into butterfat equivalent, there is an increase of 5.595 per cent in butterfat graded for the 2 months as compared with the preceding season. The above figures refer only to butter and cheese graded for export, and owing to diversions which may take place they are not necessarily a true indication of production trends.

Sheep Dipping, Dusting, and Spraying

A BIG revolution in sheep dipping methods has taken place in the past 10 years or so. Recent technical advances have been so rapid that there has been some justification for farmers being confused about their obligations in regard to control of lice and keds. This article reviews development of new methods and materials and clarifies farmers' obligations under recent amendments to the Stock Act.

By J. E. DUNCAN,
Wool Supervisor,
Department of Agriculture,
Wellington

UP to the end of the war sheep were dipped by "plunging or immersion", to quote the Stock Act, in some sort of dipping bath containing a poisonous liquid. The poison had to be sufficiently concentrated to kill lice and keds, but **not** the sheep. Most of the dipping materials at that time in favour were based on arsenic, though carbolic and derris dips were also used, either alone or in combination.

None of these dipping materials was renowned for its lasting properties in the fleece, so it was very desirable that neighbours should dip about the same time to minimise the chance of clean sheep becoming reinfested from parasite-infested sheep on adjoining properties. At that time the Stock Act provided for dipping all longwool sheep between 1 January and 31 March in the North Island and 1 January and 30 April in the South Island. Early or pre-lambing shearing was then little practised.

After the war new dipping materials, such as "Gammexane" (BHC) and DDT, became available. Their greater effectiveness and longer-lasting powers changed the whole picture. Farmers now had at their disposal new and lethal weapons in the continual war of attrition against lice and keds.

Power Spray Dips

At about the same time new methods of dipping became available in the power spray dips which had just appeared from Australia, where they originated. Power spray dipping greatly reduced the hard labour of dipping, speeded it up enormously, and converted it from one of the hardest and dirtiest jobs on the farm to a relatively easy routine operation. It also markedly reduced the losses of sheep and economised in dip. There was much to be said in its favour, provided it was used intelligently and the equipment was kept in good order.

To legalise this new practice an amendment to the Stock Act was passed in 1947 which included power spraying under the definition of dipping:

> ". . . or to spray sheep with such a preparation by means of an effective pressure spraying apparatus."

Pre-lambing Shearing Problem

About 10 years now passed without any radical changes in dipping practice; merely minor improvements in material, equipment, and methods. However, during this same period pre-lambing shearing gained greatly in popularity, particularly in some South Island districts and this created another problem. To comply with the

Stock Act farmers were obliged to dip between 1 January and 30 April, but if the ewes had been shorn in August, they would be carrying too much wool by that time for effective dipping, particularly if they were to be spray dipped. This led to a further demand for an amendment to the Act, and this was passed in 1955, legalising dipping (including power spraying) from 1 October to 30 April throughout New Zealand. It also included **all** sheep, not just longwool sheep.

The next radical change occurred only a couple of years ago. A Canterbury firm imported a number of American dusting machines and demonstrated sheep dusting throughout New Zealand. These machines used a very finely ground dust containing dieldrin as the active ingredient. In this new chemical lay the secret of their success.

As early as 1948 Americans had tried dusting for control of keds without achieving a 100 per cent kill of parasites, because at that time the three modern chemicals dieldrin, aldrin, and diazinon were not available. These three have the unique property of being able to dissolve in the wool grease and diffuse downward to skin level, where the parasites spend most of their time; hence their almost unbelievable effectiveness.

In New Zealand dusting, right from its inception, was permissible for blowfly control, but it could not be accepted as a legal substitute for dipping until carefully controlled official trials carried out by the Department of Agriculture had proved its effectiveness beyond doubt. These trials had to be extensive and thorough and therefore took some time, so it was not until recently that dusting was officially recognised.

New Spraying Technique

Almost parallel with the development of dusting a new type of spraying technique became available. In power spray dipping, developed a decade earlier, a large volume of dip at moderate pressure was applied to the sheep and the run-off was recirculated. The new idea was to use a low volume at high pressure, or a moderate volume at moderate pressure, and not recirculate any fluid which dripped off the sheep. The situation was further confused by reference to the process by various names such as misting, foaming, fogging, and tip spraying. Tip spraying is the only reasonably accurate description, as only the tips of the staples of wool are wetted. Like dusting, the treatment depends for its success on the active ingredients mentioned, which can diffuse down the wool to skin level.

With the existing wording of the Stock Act there was no legal barrier to the use of the various kinds of tip spraying machines, and many firms and even individual farmers started making them. A great variety is now available, with a similar range of effectiveness in their ability to apply sufficient active ingredient to each sheep.

From the farmer's angle dusting and tip spraying are no doubt very attractive, with their speed, ease of use, economy, and potential effectiveness.

Meteorological Records for October

Station	Height of station above M.S.L. (ft.)	Air temperatures in degrees (Fahrenheit)				Rainfall in inches					Bright sunshine hours
		Approx. mean	Difference from normal	Absolute maximum and minimum		Total fall	No. of days of rain	Difference from normal	Maximum fall		
				Maximum	Minimum				Amount	Date	
Kerikeri	240	60.1	+ 3.3	74.1	41.2	8.99	23	+ 4.48	1.90	15	155
Auckland	160	60.2	+ 2.8	71.5	44.8	5.42	20	+ 1.33	1.58	9	153
Tauranga	12	58.4	+ 2.4	69.7	36.6	8.94	21	+ 3.97	1.98	15	116
Ruakura	131	58.2	+ 3.9	73.6	40.1	3.13	21	— 1.00	0.61	9	104
Whakarewarewa ..	1006	56.4	+ 3.4	71.3	33.4	7.69	19	+ 2.31	1.86	30	88
Gisborne	14	58.6	+ 3.1	77.3	37.1	4.20	17	+ 1.77	0.90	29	128
New Plymouth ..	160	58.4	+ 4.0	73.9	42.1	3.86	20	— 1.77	0.75	12	143
Karioi	2125	52.4	+ 4.2	72.5	30.4	4.09	16	— 0.16	0.65	12	
Napier	5	58.4	+ 1.9	77.8	42.2	3.93	12	+ 2.03	1.55	13	159
Wanganui	72	57.6	+ 2.8	76.9	42.3	1.79	13	— 1.43	0.59	12	158
Palmerston North ..	110	57.6	+ 3.7	79.1	39.1	2.34	17	— 1.22	0.43	23	149
Waingawa	340	56.6	+ 3.9	76.0	40.0	2.07	14	— 0.89	0.62	12	164
Wellington	415	56.4	+ 3.6	71.6	41.6	2.79	12	— 1.44	1.07	9	190
Nelson airfield ..	5	54.4	+ 2.2	69.0	34.2	1.84	12	— 1.50	0.41	28	158
Blenheim	12	56.5	+ 2.8	76.0	31.8	1.21	9	— [illegible]	0.61	9	197
Hokitika	15	53.7	+ 2.7	66.0	33.9	9.07	19	— 1.95	1.49	8	152
Hanmer	1270	53.4	+ 2.8	75.0	33.0	2.70	12	— 1.20	0.70	12	154
Christchurch ..	22	55.2	+ 2.1	75.1	37.8	1.49	6	— 0.46	1.00	9	149
Ashburton	323	55.3	+ 2.9	80.4	33.4	2.92	11	+ 0.50	1.35	9	171
Timaru	56	53.9	+ 1.2	80.4	35.9	1.95	15	+ 0.02	0.97	9	141
Alexandra	520	55.6	+ 3.2	76.8	30.0	1.20	10	— 0.02	0.45	29	196
Taieri	80	53.0	+ 1.9	79.9	32.2	0.82	10	— 1.24	0.22	9	171
Invercargill airfield ..	0	51.9	+ 2.9	72.3	27.1	1.92	11	— 1.56	0.48	23	183
Chatham Islands ..	140	53.4	+ 3.5	61.6	39.6	3.84	10	+ 1.91	1.38	11	

However, both these methods are wide open to abuse; much more so than the older methods. There are often-quoted examples of organisms developing an immunity to various chemicals, such as micro-organisms no longer susceptible to penicillin and houseflies immune to DDT. It will be a great pity if lice and keds develop a similar immunity to the new insecticides as a result of half-hearted and ineffective use by careless operators, possibly using badly designed equipment.

Treatment Period Specified

The latest amendment to the Stock Act does something to prevent ineffective use by restricting dusting and spraying to a 3-month period immediately after shearing. This means that with shorter wool there will be fewer parasites and a better chance of the insecticides reaching them. The amendment, passed on 18 September 1958, also extends the dipping period from 1 August to 30 April to cater for those who favour pre-lambing or early shearing. Those who still use plunge dips (baths of various kinds) can dip at any time within this period. Dusting and spraying can also be carried out at any time within the period, **provided** they are done within 3 months of shearing.

Authorities in several Australian states have for some time been recommending "off-shears" dipping as the most effective method, because the parasites are reduced to their lowest numbers immediately after shearing and there is so little wool that the remainder are easily reached by dips, dusts, or sprays. Before conventional dipping or power spraying is done a period should be allowed for shear cuts to heal or there is a risk of infection from the dirty wash. With dusting or tip spraying, however, only clean material is applied to the sheep, so it is not unduly risky to carry out the operation literally "off-shears" and save another muster.

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Berry Fruit Growing Trends and Prospects

By C. S. RICHARDSON,
Berry Fruit Specialist,
Department of Agriculture,
Christchurch

COMMERCIAL cultivation of berry fruits began during the early development of New Zealand and though in the intervening years production has fallen off, at least some of the causes of this downward trend have been removed and a revival of interest in this branch of fruitgrowing is expected in the next few years.

THE collective term "berry fruit" embodies raspberries, strawberries, gooseberries, black currants, and the various hybrid bramble fruits of which boysenberries and loganberries are examples. Aggregate acreage of these fruits on commercial holdings at present is 830 acres, which is the lowest recorded for the past 10 years (see table on page 523). Even at the beginning of this century the area devoted to the growing of berry fruits was greater than today's.

With an estimated total production of 1,730 tons, the supply of fruit in relation to the present population of almost 2¼ million is low indeed. Thus commercial production of raspberries provides less than ¾ lb. per head of population inclusive of fruit used in the manufacture of jam, pulp, ice cream, and quick-frozen products. Though popular as a dessert, strawberries are marketed to the extent of 11 oz. per head only. Production of gooseberries, black currants, boysenberries, and loganberries from commercial gardens is sufficient to allow the consumption of a few ounces only per person.

These quantities are supplemented by an unknown amount of fruit produced in domestic gardens. However, with the number of flat dwellers increasing the quantity is likely to be less per head than formerly and it is apparent that production has not kept pace with the population increases.

[*Sparrow*

Production of strawberries has remained fairly stable for the last 10 years. Auckland gardens produce about two-thirds of the total commercial crop.

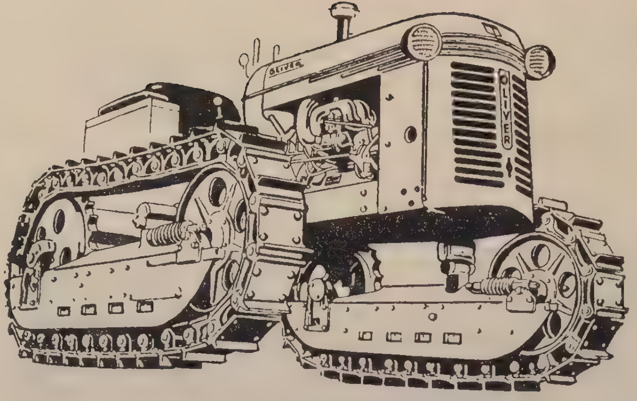
Distribution Problems

Problems of distribution arise with such highly perishable fruit, and while centres close to growing areas may be adequately supplied more remote towns may be short of requirements. An example of glut conditions occurred in the South Island with the exceptional raspberry crop of 1950, when growers were obliged to sell their produce at prices which in some instances returned little more than the cost of picking. At the time supplies were short in the north. Such reverses have contributed largely to the reduction in acreage, the discouraged growers turning to the production of less-perishable produce.

Today, with more restricted supplies and improved methods of transport, such experiences are unlikely to be repeated, and provided fruit reaches the market in satisfactory condition, the producer has little cause for concern. On the contrary, so keen is the demand for fresh fruit for household use that there is at present an unsatisfied demand for fruit for processing and home jam manufacture. Manufacturers therefore import pulp to maintain their output.

Berry fruit growing depends on the supply of a very considerable labour force at harvesting, when it is vital that the berries be picked within a few hours of ripening. Though juvenile labour is used extensively and the bulk of harvesting takes place during the school holidays, the amount and quality of labour available often fail to ensure that the crop is harvested in the best condition. This factor has been responsible for some decline in production and is a deterrent to the planting of new gardens in a number of districts.

Though acreages have shown a marked downward trend, the average production per acre for a number of fruits has improved. This is possibly due in part to the pulling out of uneconomic gardens, but a greater influence has been the general improvement in management and cultural



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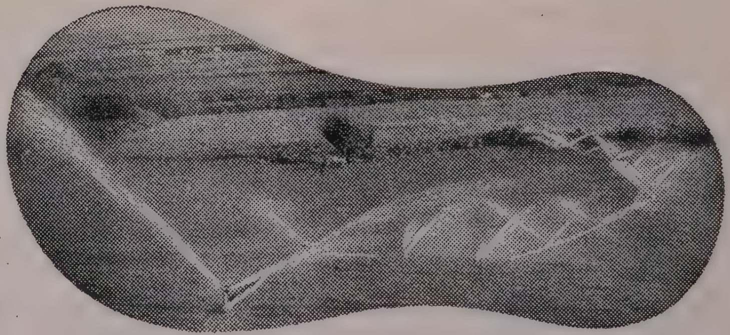

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methods. The introduction of new, more productive varieties has also played an important part.

Acreage and production trends over the past 10 years are shown in Table 1.

TABLE 1—BERRY FRUIT ACREAGES AND ESTIMATED PRODUCTION 1949-1958

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958
	ac.	ac.	ac.	ac.	ac.	ac.	ac.	ac.	ac.	ac.
Raspberries ..	754	867	865	731	603	493	473	462	448	430
Strawberries ..	364	305	305	282	304	222	267	287	274	238
Gooseberries ..	139	145	155	132	119	103	74	72	68	60
Black currants ..	153	190	187	197	189	165	115	95	78	68
Loganberries ..	13	20	23	18	16	16	12	12	12	6
Boysenberries ..	25	31	32	42	49	42	44	46	50	28
Total	1,448	1,558	1,567	1,402	1,280	1,041	985	974	930	830
Estimated production										
	tons	tons	tons	tons	tons	tons	tons	tons	tons	tons
Raspberries ..	930	930	1,460	880	870	790	700	700	740	730
Strawberries ..	580	500	460	450	520	560	580	640	650	680
Gooseberries ..	320	310	340	360	260	170	100	170	160	150
Black currants ..	200	190	250	200	200	180	120	120	100	90
Loganberries ..	40	40	30	30	40	30	30	30	20	20
Boysenberries ..	40	60	70	100	70	100	120	110	110	50
Total	2,110	2,030	2,610	2,020	1,960	1,850	1,650	1,770	1,780	1,720

Raspberries

With a total of 430 acres, raspberries are the main berry fruit at present. Principal centres of production are Canterbury (150 acres) and Nelson (126 acres).

Housing development has encroached on raspberry gardens near Christchurch, where most of them are close to the centre of the city. Much of the land round Christchurch is capable of growing good crops, and as there is a very keen demand for fruit for domestic use, a replacement programme to keep pace with population increase would appear warranted.

Waimate, formerly an important raspberry growing district, has suffered from flooding and is usually short of harvesting labour. Though the somewhat intractable soils of the district could be improved by drainage and plantings brought into a satisfactory state of production expansion in this area would not be advisable until the labour position improves.

Within the last few years a new raspberry area has developed in North Otago in the vicinity of Oamaru. Soils of this region are well drained, and provided irrigation is available during summer, the land is capable of producing heavy crops.

Cultivation of raspberries in Otago is largely confined to Beaumont in Central Otago and Outram close to Dunedin. The industry here has remained fairly stable over the past 10 years and future development will depend on the availability of land and the supply of pickers.

Increased production is warranted in Nelson and is being advocated by the Nelson Raspberry Marketing Committee to meet potential markets. The estimated Nelson raspberry crop for 1900 was 800 tons, compared with present production of about 200 tons.

Of the total area devoted to raspberry growing, only 80 acres or 18½ per cent is in the North Island, though more than 65 per cent of New Zealand's population lives there.

In recent years interest has been apparent in the cultivation of raspberries in Horowhenua and Manawatu and though the acreage planted is small, and the canes have not reached full production, these plantings on the west coast have balanced to some extent the loss of production in the Wairarapa and Hawke's Bay. However, the likelihood of some heavy falls of rain in summer in this area could lead to harvesting difficulties in large blocks of raspberries.

The distribution of raspberry gardens and district acreages and estimated production for the 1957-58 season are shown in Table 2.

TABLE 2—RASPBERRY GROWING AREAS

District	Number of commercial gardens	District acreage
Tauranga	2	2½
Hawke's Bay ..	12	18¾
Manawatu	17	25
Wairarapa	12	30
Nelson	43	126¼
Blenheim	2	2
Christchurch ..	24	96½
Waimate	30	56
Dunedin	16	38
Central Otago ..	20	28
Invercargill	2	7
Total	180	430

Lloyd George Most Popular Variety

Lloyd George is the most generally grown variety in all districts except Nelson, where Red Antwerp is favoured on account of its later season of harvesting. Of the more recent varieties, Taylor, which is more tolerant of wet soil conditions, is proving satisfactory in southern districts. Marcy, which has shown promise as an early, heavy cropping variety, is being planted to the extent that canes are available. The present shortage of planting material of all varieties may have a limiting effect on the establishment of new gardens, as well as on the replacement of older plantations, many of which have already passed their economic life.

With the present satisfactory returns and the introduction of more productive varieties, combined with new developments in cultural methods which should have the effect of reducing costs, the outlook appears more promising than it has for a considerable time.

Present indications are that 1,000 to 1,200 tons could be produced without danger of gluts, as the industry is better organised today to cope with distribution problems. Production could undoubtedly be increased on many holdings by better management, more adequate fertilisers, or the correction of drainage defects. The present average yield of about 1¾ tons per acre could be raised to 2 tons per acre, as the more productive gardens frequently yield 3 tons per acre with an occasional crop of 5 tons.

To attain the production mentioned additional gardens of 100 to 150 acres would be required, not only to supplement the crops from present plantations in 3 or 4 years, but to replace older gardens which are likely to go out of production during this period.

Strawberries

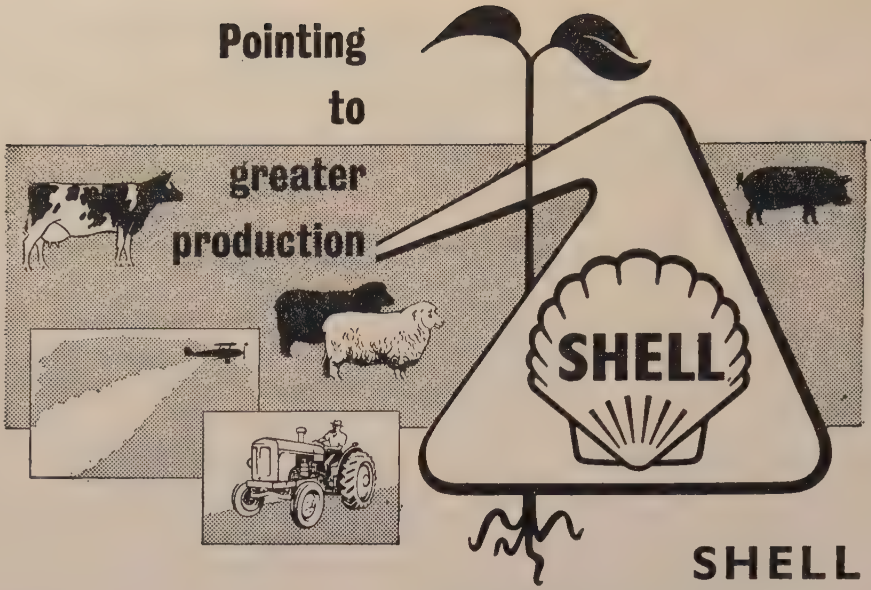
With minor seasonal fluctuations, which may be expected from a short-term crop, strawberry production has remained relatively stable over the last 10 years.

Auckland has for many years been the major district, producing approximately two-thirds of the Dominion total. Here the variety Captain Cook is grown almost exclusively. It is peculiarly adapted to the mild climate and the clay soils of the main strawberry growing areas near Auckland.

In other districts, where strawberry growing had declined, a stimulus and renewed interest were given with the introduction of Auchincruive Climax in 1949. Before this, stocks of older varieties were in such a poor state, due to virus diseases, that strawberry growing was unprofitable.

Though Auchincruive Climax has since broken down with the genetical disorder known as yellows, interest in strawberry growing has been maintained through the introduction of further new varieties, of which Talisman displays the long fruiting season and heavy cropping habit of Climax. Other varieties about which insufficient is known to make detailed comparison, but which nevertheless show promise, include Red Gauntlet, from the same Scottish breeding station as Climax and Talisman and Merton Princess.

Contemporary introductions with Climax were Perle de Prague, which is still popular in Waimate, and



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Raspberries in a Hawke's Bay garden. With the present satisfactory returns and the introduction of more productive varieties, combined with new developments in cultural methods, the outlook for raspberries appears more promising than it has for a considerable time.

Huxley, a popular variety in the Bay View area, Hawke's Bay.

Careful selection of parent plants and vigorous rogueing of runner beds have improved the standard of Captain Cook in Auckland, with the result that yields are tending to increase. It is unlikely that a more suitable variety than this New Zealand seedling will be found in the new introductions.

Virus Danger Recognised

The part played by virus diseases in the decline of the industry in the past is now generally appreciated by growers and nurserymen and greater attention is being paid to the maintenance of clean stock. Though still in the experimental stage here, the heat treatment of strawberry plants for the inactivation of virus will no doubt play a big part in maintaining the health of stock.

Of the 260 commercial strawberry gardens recorded, 120 are in Auckland Province. The present acreage of 80 acres shows a reduction on that of previous years, but this is accounted for in part by the closer planting system which is being increasingly adopted in Auckland, where plants are now set 6 in. apart, giving some 30,000 to the acre.

Waimate, with 34 holdings totalling 53 acres, retains an important place as a strawberry district, though 150 acres were grown there almost 60 years ago. Central Otago, formerly one of the largest growing areas in the days when Laxton's Noble, Ettersburg, and Melba were popular varieties, cultivates some 28 acres on 14 holdings. A further 10 acres are grown in the vicinity of Dunedin, mainly in the early locality Sawyer's Bay.

Gardens in Horowhenua

Interest is pronounced in Horowhenua which, though the most recent district to take up the growing of berry fruits, has 16 gardens with a total area of 14 acres. Christchurch produces early strawberries on the Port Hills and later crops on the plains. Some 17 acres are grown on 13 gardens. The Wairarapa gardens comprise 10 acres distributed on 9 holdings.

Estimated production for the Dominion last season was 680 tons. Main production areas were Auckland (400 tons), Waimate (70), Central Otago (80), Christchurch (30), and Horowhenua (25). Overall average production was about 2 tons 17 cwt. per acre, but exceptional yields were reported from Auckland last season, where a record crop was gathered over a longer picking season than normal.

In Auckland strawberries are cropped for one season only, the plants usually being set out in May and ploughed or disced under in February or March. With the advent of Auchincruive Climax, which produced a greater quantity of dessert berries in the first year, annual cropping was adopted in most southern districts. However, it is now becoming apparent that most of the new introductions produce more fruit in the second season, and a return to the former practice of retaining beds for two or three seasons is again evident.

As opposed to the cane fruits, which require four or five seasons to come into full production, strawberries are a short-term crop and fluctuations in demand are more readily adjusted from year to year. In practice, however, even with the increased planting trend in the south, the industry has not had to face the problem of oversupply as in the raspberry industry. The higher yield expected from the newer varieties may cause some local glutting, but as strawberries transport better than raspberries, adjustment in the distribution programme should be possible.

Cost of production is high and during the recovery period of the industry producers concentrated on the fresh fruit dessert trade. Recently increasing quantities have been directed to quick-freeze processing plants, which have afforded a convenient means of disposal during the flush of the season. Very little fruit has been supplied for jam making for a number of years, but if mutually satisfactory prices could be arranged between producers and manufacturers, there is a considerable potential outlet for small and second-grade fruit, which would give greater stability to growers.

Black Currants

The present small area devoted to black currant growing is the outcome of unsatisfactory returns in the past coupled with low yields, a combination which has made the cultivation of this fruit unprofitable. Little planting is taking place, and though a black currant plantation has a profitable life expectation of from 8 to 15 years according to the cultural attention received, many existing gardens have passed this age and the indications are that the present shortage of this fruit will be accentuated within the next 5 years.

Black currant growing is now confined mainly to the Wairarapa and Canterbury, with a combined area of 53 acres out of the Dominion total of

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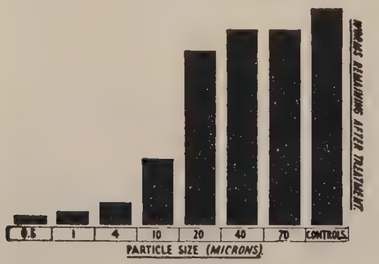

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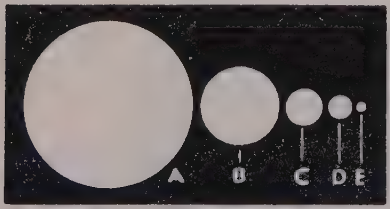

A: Particle of typical flour. *B:* Particle of face powder. *C, D & E:* Typical size range of Tartan Fenodren particles.

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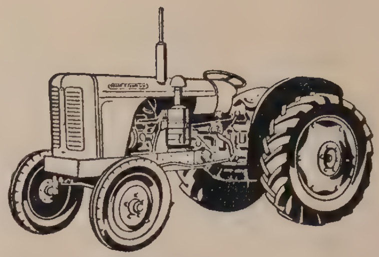

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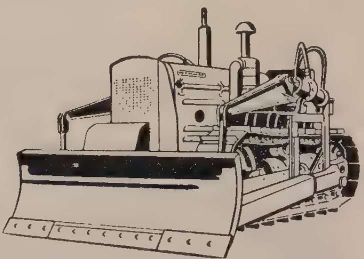

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68. Canterbury gardens are the more productive, and it is estimated that 55 tons are produced in the vicinity of Christchurch, representing well over half of the total crop. There is a limited local demand in Christchurch and a high proportion of the crop is shipped or air freighted to North Island markets. Considerable quantities of Canterbury fruit are sold in Auckland.

Prices during the past 3 or 4 years have been more in keeping with production costs and prospects appear good enough to justify limited expansion as well as providing for the replacement of many of the existing older gardens.

Though well managed gardens are capable of crops of 3 to 4 tons per acre, the average yield is about 28 cwt., which even at today's prices cannot be regarded as economic. A critical survey of the condition of existing plantations as well as management factors is a necessary preliminary to expansion.

Variety selection is important in the planting of new gardens, as one of the causes of disappointing returns is the planting of unsuitable varieties. Recent trials have shown that heavier crops may be expected from Goliath and Cotswold Cross than from many of the other varieties at present cultivated. The former appears to be suitable for most districts where black currants are grown.

Red and White Currants

Red currants are no longer cultivated on a commercial scale, as the cost of protecting the berries from birds as well as the limited demand makes production a doubtful undertaking. White currants likewise have not met with an enthusiastic reception from consumers and their cultivation is not recommended.

Gooseberries

There are 60 acres of gooseberries, of which 42 are at Greytown, 6 in the vicinity of Dunedin, 5 at Motueka, and 2 at Nelson.

All crops are harvested green for cooking, preserving, or jam making, there being little demand for ripe gooseberries as a dessert fruit, as by the time the berries reach this stage the more popular strawberry is available.

Well grown gooseberries are quite productive and are generally the highest yielding of the berry fruits, up to 5 tons per acre being picked from bushes in full bearing. The average yield is approximately 2½ tons per acre.

As with some of the other berry fruits, prices have not been sufficient to encourage the planting of new areas. Consequently, many of the gardens are past their prime and beginning to show the effect of age and disease. Though the demand for gooseberries is never likely to be as great as that for raspberries and strawberries, they are nevertheless the first fresh fruit of the season and as such have a particular appeal to many consumers. Being less exacting as to soil type and climate than a number of the other berries, they can be grown successfully in most parts from Hamilton south.

Favoured commercial types are Farmer's Glory, Roaring Lion, and Gregory's Perfection. As a result of selection at the Department of Agriculture's Horticultural Research Station, Levin, the variety Levin Early, which has the heavy cropping habit of Farmer's Glory, is now available. This variety is some 10 to 12 days earlier than Farmer's Glory, an important feature on a competitive market.

Plantations take some years to come into full bearing and have a productive life of 10 to 12 years, so if the present downward trend is to be arrested, the establishment of new gardens requires early attention. Consideration in planting new gardens must be given to potential local demand and the labour position for harvesting, though gooseberries do not require the same amount of picking labour as some of the other fruits, as it is usual to make two, or at the most three, pickings in the season, whereas raspberries and strawberries may require going over 20 to 30 times.

Hybrid Berries

The cultivation of hybrid blackberries is now limited to loganberries and boysenberries. Youngberries, which were grown some years ago in Otago, are no longer popular as a commercial fruit.

Acreages of loganberries showed a sharp decline last season, when there was a reduction from 12 to 6 acres. Reasons were housing encroachment and difficulty in obtaining picking labour.

The loganberry is essentially a jam fruit and as such has an appeal limited to those with a taste for bramble jam. Its harvesting season coincides with that of the raspberry, with which it has never been a serious competitor, though with the shortage of raspberries for jam making, the loganberry has been keenly sought by manufacturers in recent years.

All trailing brambles require to be grown on a supporting fence, which adds considerably to the cost of establishment and maintenance. Pruning and tying in of canes each winter also takes more time than similar work on the erect cane fruits. Apart from limited demand for the berries, these are factors which have influenced the establishment of plantations. Present acreage, however, has dropped to the point where the demand cannot be met, and it is considered that production could be trebled without danger of oversupply.

Boysenberries were first grown in New Zealand about 20 years ago, when their introduction caused some concern lest they should overrun the countryside in a similar way to the blackberry. Such fears proved to be unfounded and the fruit not only became popular for jam making and preserving, but was much sought as a dessert berry.

Boysenberries are cultivated in small areas in most districts from Auckland to Central Otago, as the plant is most adaptable to variations in climate and soil types.

On well managed gardens yield may be as high as 4 tons per acre, and as the berries are large, cost of picking is not as high as with most other soft fruits.

There is a tremendous unsatisfied demand, as wherever the fruit is introduced and the taste acquired, it becomes greatly sought after. Unfortunately crops are erratic owing to an unidentified disorder which in some seasons may cause almost complete loss of crop through the berries shrivelling before ripening. The trouble is being investigated, but meanwhile the planting of this berry on a large scale cannot be recommended.

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LAMB WEANING

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The hoggets should be stocked as lightly as possible for best results. Drenching is seldom necessary during the dry period, and the first drenching should be about 2 weeks after rain, and should always be followed by an immediate shift into a clean paddock, preferably prepared in advance by cattle. Drenching of the hoggets may be necessary at about 3 weekly intervals during warm, humid conditions.

TEST FOR COBALT DEFICIENCY

Cobalt deficiency may be a cause of unthriftiness in lambs from an early age, but is more likely to be important from about weaning time onward. If the disease is suspected, 20 or more lambs should each be given a cobalt bullet and the thrift of this group compared with that of a similar untreated group during the succeeding 1 to 3 months. Cobalt bullets should not be given to lambs under 8 weeks of age.

Preferably both groups should be weighed at the beginning and again at the end of the trial. An easy weighing method is for the operator to stand supporting the lamb on bathroom scales. The difference between the recorded weight and the weight of the operator gives the weight of the lamb. If at the end of the trial the average increase in weight of the bullet-treated group is more than 5 lb. greater than that of the untreated group, cobalt deficiency is indicated.

LAMB FATTENING FODDERS

Rape should not be grazed until the leaves show a purplish tinge. "Unripe" rape does not fatten so quickly and seems to "scald" more readily. Best results are probably obtained by grazing in breaks which last the lambs about a week. It is false economy to keep lambs on a break until the last leaf is eaten. Move them on while they are still getting a full feed. The paddock can be cleaned up with ewes. Run-offs have little to recommend them and unless they contain good pasture, they will depress the lambs' rate of growth. If hay is fed, it must be of the very best quality. Other fodder crops can give poor results if immature. Chou moellier, unless sown early in October, will not be readily eaten in January and February. Fed later the same crop gives excellent results. Thousand-headed kale is splendid lamb-fattening fodder, but because it is relatively unpalatable, it must be managed properly. It must always be fed in small breaks and grazed only lightly before the lambs are moved on to the next break. Never use a run-off. Treated in this way the kale makes excellent regrowth and can be regrazed several times and, if necessary, the grazing can be extended into autumn and winter.

EWE CULLING

After lambs have been weaned the ewes should be gone through carefully to select those which require culling. Feet and wool should be examined carefully. Special attention should be paid to udders and teats, and ewes should be culled if they have defective udders or very large or damaged teats, as the lambs of such ewes often die from starvation before they are a week old. If ewes are in reasonable condition and have sound udders and good fleeces, they should be retained. Even "gummy" ewes will rear satisfactory lambs on good pasture. Lambing percentage increases with age, reaching the highest level at 5 to 8 years. Many ewes on fat lamb farms could well be kept for 1 or 2 years longer, but fat ewes which have not reared a lamb should be culled. Ewes should be kept on low rations during the next 2 months to prevent their becoming overfat.

FOOT-ROT ERADICATION

Campaigns for foot-rot eradication should be started as soon as the lambs have been weaned. Once foot-rot has been eradicated from a flock it does not recur unless it is reintroduced from outside. The Department's Bulletin No. 325, "Foot-rot in Sheep Can be Eradicated", gives full instructions on the subject.

ERGOTISED GRASS MAKES DANGEROUS HAY

Serious lameness can be caused by cattle eating hay heavily infested with ergot. Such hay can be easily recognised by the black ergots which replace the seeds of ryegrass and other grasses. Where ergot is known to occur hay should be made before the grasses have time to seed.

SHEEP DIPPING

Modern dips are so effective that the eradication of lice and ticks should be quite feasible. Best results, however, will be achieved only if the instructions for mixing and replenishing dips are followed accurately. Carelessness in dipping can cause disastrous losses. If sheep are dipped off shears, the shear cuts may become infected and deaths from blood poisoning may occur. These can be prevented by vaccinating the sheep with blackleg vaccine at least a fortnight before dipping. The vaccine is available at a reasonable price. Departmental Veterinarians or Livestock Instructors should be consulted about its use.

ST. JOHN'S WORT MAKES DIPPING DANGEROUS

Sheep that eat St. John's wort become sensitive to sunlight and scabs develop on the ears, face, and back. If sheep in such condition are dipped, they take convulsions and may be drowned. If possible, sheep should be grazed on country free from St. John's wort for several weeks before dipping. If this is not possible, dip on dull days only.

CATTLE ON HILL COUNTRY

On hill country where cattle are kept primarily for development work the bulls, put out in late October, can be removed and the calves weaned at the end of January or early February. This leaves the herd unencumbered and available for useful work. Calves early weaned on hard country at an average age of 4 to 5 months may not do quite as well in their first year as those late weaned, but suffer no permanent disadvantage and by mating time at 2 years are as well developed as those late weaned.

Seed Production and Forage Crops

Seasonal Notes by the Extension Division

SERIOUS loss can be caused by neglect to set the header harvester according to the condition of the crop to be threshed. Under-threshing results in loss of seed; over-threshing results in broken grains, skinning and injury to germination (as in barley), and development of abnormal growth (as in red clover).

HEADER HARVESTER ADJUSTMENTS

IN spite of its complicated appearance the header harvester is not a difficult machine to set for the best threshing and cleaning of most of the crops it is commonly called on to handle.

The essence of making the necessary alterations correctly is to understand them and to make one adjustment at a time. When it is realised that to reduce seed damage to a minimum it is necessary to rub the seed out, not "bash" it out, it will become obvious that the drum speed must be kept down and the threshing accomplished by the rubbing action achieved as the crop passes between the drum and the concave.

The concave must be set wider at the front than at the rear so that the crop will draw through properly and it is usually set open three times as wide at the front as at the rear. The manufacturer's handbook will give a guide to settings for most crops, but the final adjustment must be made in the field under the conditions prevailing at the time. Dry conditions such as during a Canterbury norwester make for easy threshing, but colder, humid conditions make threshing more difficult and closer concave clearances necessary. At all times the concave should be kept parallel to the drum by having the same clearances on both sides measured at the front and again at the rear.

After the crop passes the drum the seed is separated from the straw or haulms on the straw-walkers and the glumes and fine material are removed from the seed on the shaker shoe with the aid of riddles and wind blast. The lower riddle should not be too small—generally a size larger than the seed—and the blast should be set so that the glumes and rubbish are "alive" on the top riddle, but not so strong that seed is blown out of the header or an excess passed off the riddle into the return auger and feed-back to the drum. This makes for double threshing and damaged seed can easily result, a fault of threshing that is both unproductive and uneconomic.

—*C. J. CROSBIE, Christchurch*

* * *

HARVESTING WHITE CLOVER

THE white clover crop will be ready for cutting when the majority—perhaps three-quarters—of the heads are brown and the seed is yellow. In a normal season the crops take about 10 or 12 days in the swath to mature before heading.

In a wet season the regrowth will grow through the swath before the crop is fit to pick up and thresh. When this happens it has to be lifted with an aerator or undermown and then aerated. These operations should be carried out only on a dull day or in the early morning or evening; otherwise much shattering and loss of seed will result.

HARVESTING COWGRASS

The normal practice with cowgrass is to take a crop of hay about the end of November or early December and then shut up for seed. The seed crop is mown and then picked up with the header.

In a wet season it is safer to leave the seed crop standing and direct head it, because at that time of the year seed heads in contact with the warm, wet ground may sprout in a few days. Even heads not on the ground may sprout in the damp swath.

HARVESTING MONTGOMERY RED CLOVER

Montgomery red clover is usually grazed until November-December according to locality and then shut up for seed. In some districts a hay crop is taken before seeding. The crop is a late maturing one and is usually direct headed. This presents considerable difficulties in wet seasons because of the excessive leaf growth, which prevents direct heading until late in the season after frosts defoliate the crop. Usually some seed is lost when the crop is left for this length of time. This obstacle may now be overcome by the use of defoliants, which are sprayed on the standing crop when most of the seed heads are mature. The defoliant dries up the herbage, thus making the crop fit to direct head in a few days after application and weeks earlier than it would be if it were not sprayed.

—*H. A. ARTHUR, Timaru*

* * *

FEEDING OF FORAGE CROPS ON DAIRY FARMS

BREAK grazing with the electric fence is the most practical method of feeding summer forage crops and should be begun before shortage of feed has affected the daily milk yields of the herd. Only if feed is in very short supply is it worth while carting a crop out.

An acre of good turnip or chou moellier crop is sufficient for 10 cows for 60 days. If sufficient area of crop is available, it should be rationed to 4 sq. yds. per cow each morning and each evening. Feeding directly after milking will prevent the occurrence of feed flavours in the milk.

In feeding off turnips all that is necessary is to erect the electric fence in the crop. The wastage from this method of feeding has been measured at about 12 per cent of the crop, but this could be reduced further if the embedded portions of bulbs were later disced or harrowed out for a second grazing.

Maize and chou moellier should be mown in strips before feeding. Feeding of standing crops with the electric fence can result in a waste of 50 per cent of the crop. The electric fence should be erected so that the cows have to reach under it for their food and cannot short-circuit the fence by pulling standing stalks against it. An old adapted horse-drawn mower is very suitable for cutting the crop because of the ease of attachment to the tractor. Fingerwheel-type side-delivery rakes are very effective in raking heavy crops clear, thus facilitating the use of the electric fence.

—*B. A. GUNNING, Matamata*

Lead Poisoning in Dogs

By E. L. J. STAPLES,
Technical Officer,
Department of Agriculture's
Wallaceville Animal Research
Station

Care in the use of lead paints and in the disposal of empty paint tins may save the life of your dog.

THE danger of lead and its compounds to farm animals, especially old and young cattle, has been stressed many times, but only in recent years has the high incidence of lead poisoning in dogs been recognised. This article discusses the symptoms of lead poisoning in the dog and summarises the possible sources of lead from the histories of the numerous cases of poisoning diagnosed at the Wallaceville Animal Research Station over the past 5 years.

LEAD is a cumulative poison and a sudden attack may occur after a long period of administration of small doses. This attack is similar to an acute attack caused by the ingestion of large amounts. It is known that both the chronic and acute forms of lead poisoning occur in dogs in New Zealand. Records show that the incidence in young dogs is higher than in older animals, and puppies have been shown experimentally to be more susceptible to lead poisoning than are adult dogs.

There is little doubt that in the past lead poisoning has been confused with the virus diseases, distemper and contagious hepatitis. Symptoms shown by animals affected with any of these diseases may be very similar.

A number of complicated cases have also been handled in which dogs suffering from distemper or contagious hepatitis have also shown on analysis abnormal amounts of lead in the liver and kidneys. In some cases these levels cause fatal lead poisoning. As mentioned previously, lead is a cumulative poison and exposure over a long period allows high concentrations to be stored in the bones. While lead is stored in this way it does not affect the animal, but this stored lead may be mobilised by a metabolic upset or an infectious disease and symptoms of lead poisoning then develop. In these complicated cases it is probable that the distemper or contagious hepatitis initiated the mobilisation of lead stored in the bones of the affected animals.

Whether the dogs died from lead poisoning or the virus disease is a debatable but somewhat academic point.

Symptoms

The symptoms noted have not been consistent in all cases. With acute poisoning the dog may be seized with convulsions and die within a few hours without showing other obvious signs of distress. Usually, however, the animal appears listless, refuses food over a long period, and becomes emaciated. Signs of colic may be exhibited with restlessness and moaning. Some dogs develop diarrhoea, often bloodstained; others become constipated. Vomiting, trembling, champing jaws, and frothing at the mouth usually precede convulsions. There may be partial paralysis in the hindquarters and a discharge from the eyes and nose. Blindness has been reported in some field cases. Normally quiet dogs often become vicious and show a marked change in temperament.

Sources of Lead

Though it has not been possible to trace the sources of lead in most cases of poisoning, over the past 5 years sufficient evidence has been accumulated for some conclusions to be drawn. Dogs probably have a greater opportunity than most animals to eat lead in the form of paint because of their habit of chewing all manner of foreign objects. Puppies are the worst offenders in this respect.

In many of our cases painting has been done around the house before the dog's illness. Several of the dogs have been owned by painters, and one animal was seen drinking from a pot of white paint. Another dog was seen eating the flakes of paint as they were burnt and scraped from the woodwork. Empty paint tins left lying about to fill with water from which an animal may drink are another possible source. The lead in the paint is not soluble in the water, but dogs probably dislodge and swallow particles of paint as they drink from the paint tins.

Sticks used for stirring paint should not be thrown into the yard for the dog to chew, and if the kennel or pen requires painting, many brands of non-lead paint are available.

Paint adhering to the hair has undoubtedly been the source in at least two cases. The dogs had evidently brushed against a freshly painted surface, and as they have a natural dislike for anything sticking to their coats, have licked themselves to remove it. Food for the dog should not be placed on painted woodwork. Loose flakes of paint will cling to the food and be eaten with it.

Overseas workers have reported cases of lead poisoning in dogs following the swallowing of lead foil and a lead drapery weight. In two of our cases metallic lead was suspected —in one a lead door stop which the dog continually chewed in attempting to open the door, and in the other an old leadlight.

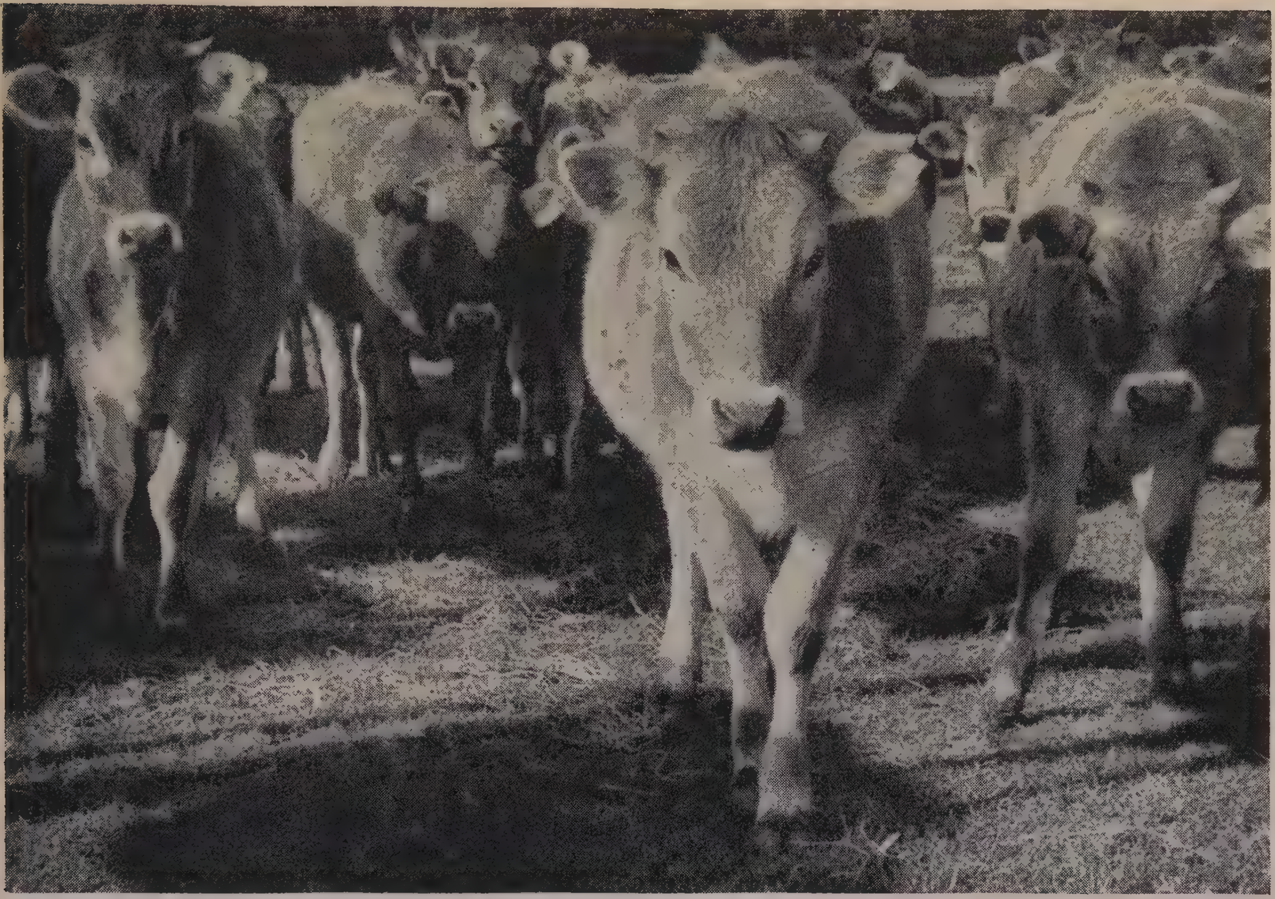
There is little doubt that paint has been responsible for most of the cases of lead poisoning diagnosed, but it seems that lead in any form could be a possible hazard to dogs, which may develop a depraved appetite similar to that of cattle for lead and its compounds.

Treatment

Veterinarians have reported the successful treatment of lead poisoning in dogs with a drug called calcium disodium ethylene diamine tetra-acetate. Speed in beginning treatment is usually necessary for success.

However, prevention is better than cure, and a little care and thought in the use of lead paints and the disposal of empty paint tins may save the life of your dog.

Rear Your Own Herd Replacements



By A. R. MURDOCH,
Livestock Instructor,
Department of Agriculture,
Stratford

and H. G. TURNBULL,
Research Officer in Farm Management,
Department of Agriculture,
Palmerston North

LOWER prices for dairy produce require some thought to be given to the reduction of production costs. One way of doing this would be to lower the cost of herd replacements. It is common practice for farmers, especially in Taranaki, to buy in 2-year-old heifers close to profit. They consider it to be more profitable than rearing their own, because extra milking cows can be carried, but investigation does not bear this out.

NEW ZEALAND Dairy Board records show that the average herd wastage in tested cows in Taranaki is 18 per cent. It can therefore be assumed that 20 per cent or a fifth of the average herd must be replaced each year. With this heavy wastage, a herd of 100 cows provides barely sufficient good-quality heifers for replacement. Normally, in a herd of this size, a choice of 35 heifer calves can be expected. This does not include the 10 or so heifer calves from the first calvers, because these are not usually kept, as they are generally small and light. An owner would need 21 or 22 calves as replacements and any more kept would be from cows with lower production than the herd average.

Most of the close-to-profit heifers offered for sale will be the surplus from other milking herds and will be from the lower producing cows. Generally therefore buyers will be lucky to get a good producer. At present stock prices the risk is really greater than the farmer can afford to take.

The following table shows the estimated costs and the actual cash outlay for rearing a 2-year-old heifer until it comes to profit. It is based on calf-rearing experience at the Stratford Demonstration Farm with the Ruakura early weaning system. This provides for weaning at 8 weeks when the calves are up to the required standard and if sufficient reasonably good pasture is available to graze them rotationally.

COST OF REARING A 2-YEAR-OLD HEIFER
(With 8-week weaning system)

	Estimated cost			Actual cash outlay		
	£	s.	d.	£	s.	d.
Feeding to 8 weeks, 96 lb. of buttermilk powder @ 5d. per lb. (2 lb. to 1 gal. water)	2	0	0	2	0	0
Labour 6 mins./day, 6 hrs. @ 6s. per hr. ..	1	16	0			
Grazing charge:						
First year @ 2s. per week	5	4	0			
Second year @ 3s. per week	7	16	0			
Handling charge:						
First year	1	0	0			
Second year	2	0	0			
Veterinary charges (black-leg 2s., contagious abortion 2s., other 1s.)		5	0		5	0
Bull service charge ..	1	10	0			
Hay, 6 bales @ 4s. ..	1	4	0			
	22	15	0	2	5	0

Labour, grazing, hay, and bull services are already available on the farm and the cash outlay could be practically eliminated by using whole milk. The Stratford Demonstration Farm is on tanker supply, so reconstituted buttermilk is more convenient to feed and cheaper than whole milk.

To get a healthy 2-year-old heifer with a known production background for a cash expenditure of £2 5s. is good business. The heifer will have been saved from one of the best cows in the herd. If this cow has been bred to A.B., the daughter's production can be expected to be higher than the average for the herd.

On the other hand, the cash outlay of between £22 and £35 (May 1958) to buy a 2-year-old heifer with an unknown production and disease background is a gamble which, on a falling market, can be risky. Such a heifer would probably take 2 years to pay off her capital cost.

Rearing of young stock will reduce the number of milking cows that can be carried, but the drop in replacement costs, and the better results from one's own selected stock, will more than compensate for any loss of butterfat.

A partial budget illustrates this point:

	£	s.	d.
Buying in replacements			
50 cows producing 260 lb. of butterfat @ 2s. 8d. per pound	1,733	6	8
50 bobby calves @ £2 each ..	100	0	0
	1,833	6	8
Less 10 replacement in-calf heifers @ £30	300	0	0
	1,533	6	8
Rearing own replacements			
45 cows producing 280 lb. of butterfat @ 2s. 8d. per pound	1,680	0	0
36 bobby calves (45 less 9 retained) @ £2	72	0	0
	1,752	0	0
Less cash outlay to rear 9 replacement heifer calves @ £2 10s.	22	10	0
	1,729	10	0

Agricultural and Pastoral Show Dates

THE following are dates and venues of A. and P. shows up to the end of March:

NORTH ISLAND

January

1 January—Nuhaka A. and P. at Nuhaka.

9 and 10 January—Wairoa County A. and P. at Wairoa.

17 January—Central Hawke's Bay A. and P. at Waipukurau.

*23 and 24 January—Feilding I., A., and P. at Feilding.

28 January—Marton District A. and P. at Marton.

*30 and 31 January—Horowhenua A. and P. at Levin.

31 January—North Kaipara A. and P. at Paparoa.

February

5 February—Te Kauwhata A. and P. at Te Kauwhata.

6 and 7 February—Rodney A. and P. at Warkworth.

7 February—Rangitikei A. and P. at Taihape.

7 February—Woodville A. and P. at Woodville.

*10 and 11 February—Dannevirke District A. and P. at Dannevirke.

11 February—Te Awamutu A., P., and H. at Te Awamutu.

13 and 14 February—Taranaki A. and P. at New Plymouth.

13 and 14 February—Taumarunui District A. and P. at Taumarunui.

14 February—Otorohanga A. and P. at Otorohanga.

14 February—Pahiatua A. and P. at Pahiatua.

14 February—Opotiki A. and P. at Opotiki.

14 February—Hukerenui A. and P. at Hukerenui.

19 February—Matamata A. and P. at Matamata.

*20 and 21 February—Masterton A. and P. at Masterton.

20 and 21 February—Te Kuiti and District A. and P. at Te Kuiti.

20 and 21 February—Franklin A. and P. (70th Annual Show) at Pukekohe.

21 February—Waiapu P. and I. at Ruatoria.

21 February—Northern Wairoa A. and P. at Mititai.

21 February—Whakatane A. and P. (50th Jubilee) at Whakatane.

25 February—Morrinsville A. and P. at Morrinsville.

27 and 28 February—Ohura A., P., H., and I. at Nihoniho.

27 and 28 February—Wellington and Hutt Valley A. and P. at Trentham.

*28 February—Waimarino A., P., H., and I. at Raetihi.

28 February—Putaruru A. and P. at Putaruru.

28 February—Te Puke A. and P. at Te Puke.

March

7 March—Waiotira Junction A. and P. at Waiotira.

*7 March—Mangonui County A. and P. at Kaitaia.

7 March—Albany A. and P. at Albany.

7 March—Tauranga A. and P. at Tauranga.

20 and 21 March—Wellsford A. and P. at Wellsford.

21 March—Poverty Bay Autumn Carnival at Gisborne.

SOUTH ISLAND

January

10 January—Blueskin A. and P. at Waitati.

17 January—Waikouaiti A. and P. at Waikouaiti.

24 January—Waiau A. and P. at Tuatapere.

24 January—Golden Bay A. and P. at Takaka.

24 January—Palmerston and Waihemo A. and P. at Palmerston.

27 and 28 January—Otago A. and P. at Dunedin.

31 January—Banks Peninsula A. and P. at Little River.

31 January—Peninsula Horse Show and A. and P. at Duvauchelle.

February

14 February—Inangahua A. and P. and Sports Association at Reefton.

*14 February—Central Otago A. and P. at Omakau.

*21 February—Maniototo A. and P. at Ranfurly.

21 February—Murchison A. and P. at Murchison.

*28 February—Kaikoura A. and P. at Kaikoura.

March

7 March—Mount Benger A. and P. at Roxburgh.

7 March—Amuri A. and P. at Rotherham.

7 March—Temuka and Geraldine A. and P. at Winchester.

*14 March—Cheviot A. and P. at Cheviot.

14 March—Upper Clutha A. and P. at Wanaka.

14 March—Mayfield A. and P. at Mayfield.

21 March—Methven A. and P. at Methven.

*21 March—Hawarden A. and P. at Hawarden.

30 March—Strath Taieri A. and P. at Middlemarch.

30 March—Mackenzie County Highland Show at Fairlie.

* The Department of Agriculture exhibit will be staged at this show.

Main Wool Sales

The dates and venues of main wool sales until the end of March are:

9 January: Wanganui.

14 and 16 January: Auckland.

21 and 23 January: Napier.

28 and 30 January: Wellington.

9 and 11 February: Christchurch.

16 and 18 February: Invercargill.

23 and 25 February: Dunedin.

2 March: Timaru.

11 March: Wanganui.

16 and 18 March: Auckland.

23 and 25 March: Napier.

Ram Fairs

The following are dates and venues of ram fairs up to the end of March:

8 December—Central Hawke's Bay at Waipukurau.

11 and 12 December—Hawke's Bay at Hastings.

19 January—Wairoa at Wairoa.

19 and 20 January—Masterton at Masterton.

27 and 28 January—Feilding flock at Feilding.

5 February—Canterbury stud at Addington.

12 and 13 February—Canterbury flock at Addington.

13 February—Timaru at Timaru (all breeds).

13 February—Dannevirke at Dannevirke.

20 February—Timaru at Timaru (fat breeds).

24 February—Otago at Dunedin.

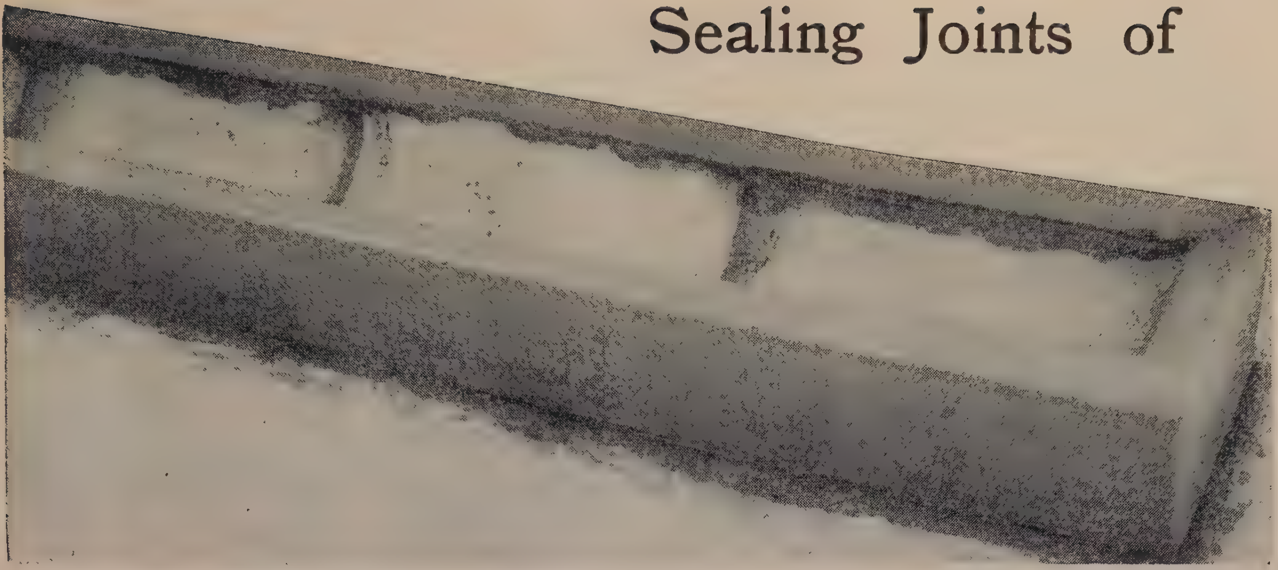
25 February—South Otago at Balclutha.

5 March—North Otago at Oamaru (mutton breeds).

6 March—Timaru at Timaru (wool breeds).

9 March—North Otago at Oamaru (wool breeds).

Sealing Joints of Glazed Tile Pig Troughs



By A. LONGWILL,
Superintendent, Pig Industry,
Department of Agriculture,
Wellington

The filling after being trowelled level may be finished with a few light strokes of a paint brush dipped in the mix water.

GLAZED earthenware channel tiles (half pipes) of 9 or 12 in. diameter have been popular for many years for lining pig troughs in permanent piggeries where floors and walls are largely constructed of concrete. However, one drawback has been that the cement used in jointing the sections of a trough has usually been eroded by the action of milk acids after a year or two of use. A method which has been found satisfactory in prolonging the life of the plaster joints considerably is shown in the accompanying illustrations.

THE sections of trough are laid level on a bed of ordinary concrete mix in the wooden boxing placed to enable a 2 in. wall to be filled to support the glazed liners. The filling is tamped into position and allowed to stand for 24 hours, after which the boxing may be removed and the jointing and plastering carried out.

As a first step in the mixing, 1 part of a proprietary compound, giving increased adhesive properties to the mix, is added to 3 parts of the mixing water. The plaster ingredients are:

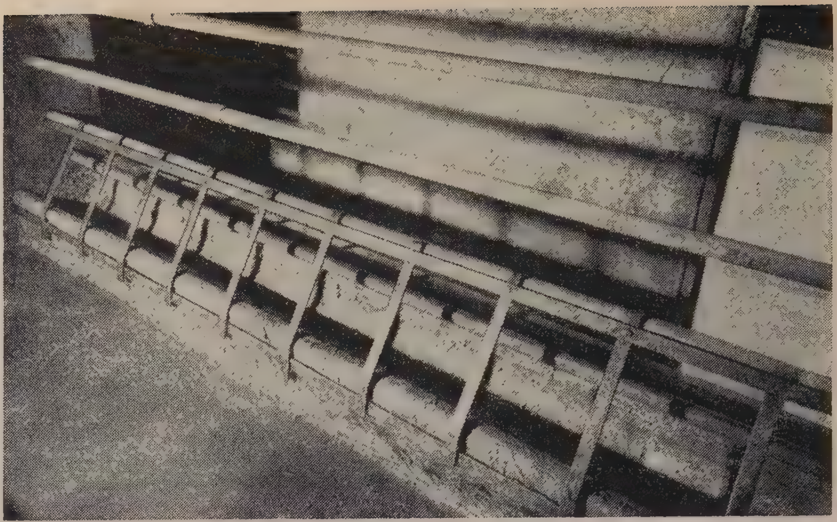
	Parts by volume
Silver sand	5
Cement	4
Red oxide	2½

The mixing water is added carefully while the ingredients are mixed until the whole forms a smooth, easily workable plaster. The joints are given a coat of a neat cement wash mixed with the prepared mix water and then the plaster is applied. It is worked carefully into each joint so that the ½ to ¾ in. spaces between sections are completely filled. The filling is trowelled level and may be finished with a few light strokes of a paint brush dipped in the mix water.

The plastering round the whole trough and covering all edges of the liners is then carried out, giving a finished appearance like that in the heading illustration. This leaves no uneven concrete surfaces in which milk may lodge and thus start erosion. A smooth finish may thus be almost as important as the mix in ensuring a long life for the plaster.

A point often overlooked in the construction of this type of trough is the desirability of providing "toe" room for the pigs when feeding. This can be done by cutting the front board of the boxing to slope 2 in. back under the trough at floor level. A trough in which the interior surface of the bottom is at floor level (the same level as the pigs' front feet) gives the most comfortable feeding position and tends to discourage the pigs from putting their feet in the trough.

However, to control the pigs effectively, a head bail device similar to that shown above, or some other type of obstruction which prevents feet and head getting into the trough at the same time, will also be needed.


Head bail arrangement which prevents pigs from getting both head and feet in the trough at the same time.

☆

Performance of Pedigree Pigs

DURING the 9 months ended 30 September 1958, 44 pedigree litters have been recorded out of 52 nominations under the Pedigree Pig Improvement Scheme. Of these, 13 litters qualified for the Register of Merit class A, 9 of these being evaluated as porkers and 4 as baconers. One litter qualified in Class C of the register. All the qualified litters were Large Whites.

Breeders or commercial farmers interested in securing boars or sows the litter mates of which have performed up to the standards laid down for the register should study this table carefully to find pigs with the qualities they particularly require.

Full details of the performance of these qualified litters are set out below.

Owner	Herd book no.		Date born	Litter weight at 3 weeks	Dead weight	Carcass test results (average) points										
	Sire	Dam				Growth rate	Length	Back fat Sh.	Back fat Loin	Bal.	Ham	Sh.	L.*	B.*	M.*	Total
CLASS A																
PORKERS				lb.	lb.	(25)	(20)	(10)	(15)	(5)	(15)	(10)	(10)	(5)	(10)	(125)
E. W. Harrison, Palmerston North	14,134	14,630	28/11/57	82	73	25	16½	6½+	12—	5	8½	7	7½	3½	9½	101
S. C. Yeates, New Plymouth ..	13,686	14,138	8/12/57	143	96	22½	16½	6½+	†13	4½	10	6½	6½	4½	10	100½
C. I. Wright, Kaitaia	13,590	14,436	29/12/57	131	71	21	13½	9—	13½+	5	11	6	7	3½	10	99½
H. and N. Myers, Mauriceville ..	14,372	14,185	12/1/58	113	90	22½	14½	8½—	14—	3½	9½	6½	7½	2½	7	96
C. I. Wright, Kaitaia	13,590	13,810	10/12/57	114	73	20½	12	6½+	10+	4½	12	9½	7	3	10	95
E. W. Harrison, Palmerston North	14,134	14,632	10/12/57	91.6	81	19	17½	7½+	9+	3	11½	7½	7½	2½	9	94
L. Butler, Hawera	14,510	14,391	8/12/57	114	65	6½	17	9+	14—	5	13½	10	8	5	4½	92½
H. and N. Myers, Mauriceville ..	14,372	14,186	12/2/58	105	71	22	12	9—	13+	5	5½	5	5½	3	9	89
E. R. and A. L. Skilton, Wanganui	14,071	13,348	7/4/58	137	75	10	15½	9—	12+	5	9	7½	7½	5	7	87½
BACONERS						(25)	(20)	(10)	(20)	(5)	(15)	(10)	(10)	(5)	(5)	(125)
N.Z. Pig Producers' Council ..	13,631	13,762	18/7/57	120	141	21½	14	8½+	17—	4	7½	7½	7	6	2½	94½
N.Z. Pig Producers' Council ..	13,631	14,044	19/1/58	128	131	25	17	8—	16—	3	7½	7½	5½	3	1½	94
N.Z. Pig Producers' Council ..	13,631	13,145	8/7/57	135	145	17	14	9½+	17½+	1½	10	7½	7	5	3	92
N.Z. Pig Producers' Council ..	13,631	13,763	9/7/57	121	139	16½	13	8½+	20	3	11½	6	6½	3½	3	91½
CLASS C																
PORKERS																
H. E. Johnson and Co., Whangarei	11,492	12,374	13/2/58	89	79	17	13	9½+	14—	3½	10½	7½	6½	4	10	95

+ Points lost because too much fat; — points lost because too little fat; * L., loin development; B., belly thickness; M., marketing points; † 1 pig 13+, other 13—.

Chemical Weed Control in Gladiolus

By J. P. SALINGER,
Horticulturist
Department of Agriculture,
Wellington

Chemical weed control in gladiolus. The plot in the foreground was treated with dinoseb/dinosam plus diesel fuel oil applied pre-emergence at the end of October; monuron (2½ lb. per acre) was applied post-emergence in mid November. The plot in the background was untreated. (Photographed in mid February.)

WEED control in plantings of gladiolus is comparatively simple with the use of new types of weedkillers now becoming available which can be applied to bare soil between growing crops to control germinating weed seeds and yet not harm the crops. These have special value where gladiolus are grown for both corm and cut flower production. These materials are monuron (CMU) or diuron (DCMU), neburon, CIPC, and dinoseb/dinosam with diesel fuel oil.

EFFICIENT and persistent weed control will be obtained only if the following points are observed:

1. The land must be free of perennial weeds and the soil cultivated so that the surface is weed free.
2. The soil must be sufficiently moist to encourage the germination of weed seeds.
3. The materials should be applied when there is a likelihood of some rain or when irrigation can be applied.
4. The correct material must be chosen for controlling the weeds which are likely to occur.
5. After application the soil surface should not be disturbed or cultivated.

The application of dinoseb/dinosam should be delayed until weeds have germinated and reached the seed-leaf stage. The efficiency of monuron and CIPC varies with the soil and climate. On light sandy soils or in dry areas they are likely to be less effective than on silts, loams, or clays and in areas of moderate rainfall.

Trials carried out at the Department of Agriculture Horticultural Research Station, Levin, for 2 years on a silt loam have shown that two applications of the appropriate weedkiller will replace five cultivations, with no damage to leaves, flower spikes, corms, or cormlets.

Time of Application

Dinoseb/dinosam plus diesel fuel oil should be applied **before** the growing points of the gladiolus have emerged from the soil (pre-emergence). Monuron and CIPC can be applied both before and after emergence of the growing points (pre-emergence and post-emergence).

Recommended Programmes

Several combinations of the weedkilling materials which will provide complete control are given below. Treatment 1 is the cheapest, but not the easiest to apply; treatment 6 is the most expensive. The cost of material only in all cases would not exceed £14 per acre.

Dilution with Water

The amount of water with which the materials should be mixed depends on the output of the sprayer used for applying the materials. All of the materials may be applied by low-volume sprayers, though there is always a slight danger of spray drift. The important point is to apply the correct total quantity of material per acre.

Even if a grower does not have adequate equipment for complete spraying of field plantings of gladiolus,

WEEDKILLING TREATMENTS

	Material	Rate per acre	Rate per 60 sq. yds.
Treatment 1:			
Pre-emergence	Dinoseb/dinosam	4 pints	1 fl. oz.
	Diesel fuel oil	12 gallons	1¼ pints
Post-emergence	CIPC (4 lb. active ingredient)	1 gallon	2 fl. oz.
Treatment 2:			
Pre-emergence	Dinoseb/dinosam	4 pints	1 fl. oz.
	Diesel fuel oil	12 gallons	1¼ pints
Post-emergence	Monuron	2½ lb.	½ oz.
Treatment 3:			
Pre-emergence	Monuron	2½ lb.	½ oz.
Post-emergence	CIPC	1 gallon	2 fl. oz.
Treatment 4:			
Pre-emergence	Monuron	2½ lb.	½ oz.
Post-emergence	Monuron	2½ lb.	½ oz.
Treatment 5:			
Pre-emergence	CIPC	1 gallon	2 fl. oz.
Post-emergence	CIPC	1 gallon	2 fl. oz.
Treatment 6:			
Pre-emergence only	Monuron	5 lb.	1 oz.

Chemical weed control in gladiolus: CIPC applied pre-emergence at 4 lb. per acre in the third week of October and post-emergence at 4 lb. per acre in mid November. (Photographed in mid February.)

he can do band spraying along the rows of plants to save labour in general cultivation. After spraying in this way care should be taken not to throw the cultivated soil between the rows on to the sprayed area.

Choice of Materials

Both the cost and properties of the various weedkillers should be considered before a final decision is made about which combination to use.

Dinoseb/dinosam is poisonous. The operator should wear protective clothing or at least rubber boots, gloves, and goggles when handling the concentrate and, if there is a danger of spray drift, while spraying. The concentrate should be mixed with a small quantity of water and then added to the diesel fuel oil. This mixture should be poured into the spray tank and the remainder of the water added. The chemicals will control seedlings of weeds and some germinating seeds and should be used only at the pre-emergence stage of the gladiolus.

Monuron is a wettable powder which does not fully dissolve in water and the spray mixture should be well agitated during application. At 5 lb. per acre, treatment 4 (two applications of 2½ lb. per acre), there is a danger that the material will persist too long in the soil and affect the germination of the seed of desirable plants sown in treated soil the following season. In this respect the materials diuron and neburon may prove safer and also more effective in high-rainfall areas, but they have not yet been tested on gladiolus. Monuron is particularly effective in controlling *Portulaca* from seed.

CIPC is a liquid which mixes well with water and is the easiest of the materials to apply. At 4 lb. per acre it gives good control of seedling grass weeds and many broad-leaved weeds. At this rate it does not satisfactorily control sow thistle or cruciferous weeds such as shepherd's purse and twin cress, for which higher rates (up to 6 lb. per acre) may be required. One commercial gladiolus grower has used 6 lb. per acre with no apparent damage to the gladiolus.

Another material, 2,4-DES at 5 lb. per acre, has been tested at various times, but has given very variable results.

Mulching for Weed Control

Small areas of gladiolus corms and cormlets can be kept comparatively free of weeds by mulching the soil after planting with 2 in. of sawdust. Though weeds will penetrate this mulch, they can be easily removed. When sawdust is used, additional nitrogenous fertiliser should be applied either in the base dressing or before the sawdust is applied. The sawdust should be from timber that has not been treated with wood preservatives.

Radio Broadcasts for Farmers

RADIO broadcasts for farmers are given as follows:

1XH Hamilton, Mondays at 12.33 p.m. and Tuesdays at 8 p.m. (Frankton stock market report), Wednesdays at 12.33 p.m. (report from Ruakura Animal Research Station), Thursdays at 12.33 p.m., Fridays at 8 p.m. (stock sale review).

1XN Whangarei, Mondays at 8 p.m. (Northland livestock report and "Farming for Profit"), Wednesdays at 8 p.m. ("Farming for Profit"), and Fridays at 8 p.m.

1YA Auckland, Mondays at 12.33 p.m., Tuesdays, Wednesdays, and Thursdays at 7.45 p.m., and Fridays at 6 p.m. and 7.45 p.m.

1YZ Rotorua, Mondays at 12.33 p.m. (Waikato stock market review), Tuesdays at 7 p.m. (Hamilton stock market report), Wednesdays at 7.15 p.m., Thursdays at 12.33 p.m.

2XA Wanganui, Wednesdays at 8 p.m. (stock sale report), Thursdays at 8 p.m.

2XG Gisborne, Tuesdays at 8 p.m., Fridays at 8.2 p.m. (Gisborne stock market report).

2XN Nelson, Thursdays at 8 p.m.

2XP New Plymouth, Thursdays at 8.1 p.m.

2YA Wellington, Mondays at 7.15 p.m., Thursdays at 12.33 p.m., Fridays at 7 p.m. (Feilding stock market report).

2YZ Napier, Tuesdays at 12.12 p.m. (Hawke's Bay orchardist session), Tuesdays at 7.10 p.m., Wednesdays at 7.15 p.m. (Hawke's Bay-Poverty Bay livestock market report), Thursdays at 12.33 p.m.

2ZA Palmerston North, Mondays at 12.33 p.m., Fridays at 8.45 p.m. (Feilding stock market report).

3XC Timaru, Mondays at 8 p.m. (Pleasant Point stock market report), Tuesdays (fortnightly) at 8 p.m. (Temuka stock market report), Wednesdays at 8 p.m., and Saturdays at 10.30 a.m.

3YA Christchurch, Mondays at 12.20 p.m., Wednesdays at 7.15 p.m. (Addington stock market report), Thursdays at 12.33 p.m. and 7.15 p.m.

3YZ Greymouth, Mondays and Thursdays at 12.33 p.m.

4YA Dunedin, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m., Wednesdays at 12.33 p.m. and 6.50 p.m. (Burnside stock market report), Thursdays at 12.33 p.m.

4YZ Invercargill, Mondays at 12.33 p.m., Tuesdays at 12.33 p.m. and 7.15 p.m. (Lorneville and Gore stock market reports), Wednesdays at 12.33 p.m., Thursdays at 12.33 p.m.

Developments in

Circulation Washing of Milking Machines

DEVELOPMENTS which have taken place in milking machine design in relation to circulation washing during the past few years are discussed by D. S. M. Phillips, Physicist, Department of Agriculture Ruakura Animal Research Station, in this article, which is an adaptation of a paper given at the Massey College Dairy Farmers' Week. The author deals particularly with a recently developed circulation washing system that can be applied to any type of plant and indicates how it can be used to make machine washing easier and more efficient and at the same time to improve milking efficiency.

THE principle of circulation washing under vacuum was first introduced on the Ruakura milking machine several years ago. In this system the detergent washing solutions are circulated round the plant continuously for 8 to 10 minutes while the plant is operating under its normal vacuum. The long period of contact between the washing solutions and the surfaces to be cleaned permits very effective use of the detergent or sterilising solutions and also allows the plant to reach the full temperature of the water for a considerable time.

During the circulation process a violent scrubbing action is maintained by allowing some air to enter the plant, and this coupled with the high rate of circulation, produces a very effective cleaning action. Trials carried out some time ago using metal plates with carefully prepared milk deposits dried on to them indicated that circulation washing applied for only 4 minutes was as effective in removing the deposits as the normal flush-washing method repeated 10 times. The efficiency of washing, of course, varies for different parts of the plant.

Ruakura Milking Machine

After some modifications to the circulation system the Ruakura milking machine has proved to be very satisfactory, and under most conditions the plants have maintained a very satisfactory level of cleanliness. The modifications, made mainly on the rate of circulation of the water and the entry of air to the system, are listed below.

1. The wash circulation was **terminated at the releaser** so that the need for changing the releaser spit chamber to the vacuum tank is eliminated, and the risk of entry of froth and spray to the vacuum pump considerably reduced.
2. Two small taps were placed in the **master pulsator line** so that the bail pulsators could be placed in the vacuum position during the washing process. This reduces the air consumption and, since the pulsators are in the open position all the time, causes less obstruction to the flow of water. This is particularly important in larger plants, in which the air consumption during washing was excessive and the circulation rate was far too low.

The stopping of the pulsators also had the effect of preventing the build-up of detergent deposits in the pulsators, a condition which caused much trouble with these units in the early stages.

3. The **releaser pulsator** is now washed by allowing some of the wash water to pass through a small tube connecting the circulation inlet to the releaser pulsator itself. This connection is made automatically when the valve is switched to the wash position. In addition to washing the pulsator this method results in a reduced efficiency of the releaser during the wash, due to the lower vacuum in the spit chamber, and as a result the releaser floods to a level which causes violent surging to take place, with resultant thorough washing of the releaser and carry over of water to the air pipes and vacuum tank.

The system is now more convenient and produces a higher rate of circulation and consequently better washing. At the same time the elimination of the vacuum tank from the circulation results in the saving of some heat, so that the water remains at a higher temperature during the cycle.

Further Development of Principle

The experience of the last few years has indicated that the principle of circulation washing of the plant under vacuum is sound. Eventually all milking plants may be fitted with such facilities as part of their normal equipment, and with further development the system will become simpler and cheaper. In the not too distant future the whole system will probably be made automatic. By this is meant that the wash cycle of cold rinse, hot detergent, and sterilising rinse will be controlled automatically so that once the valve has been placed in the wash position the process will continue through all phases of the washing without further attention.

Recent Commercial Developments

Some indication of this development can be gained from some inventions already under test in the field. One instance is the two-way circulation system controlled by a single valve attached to the releaser.

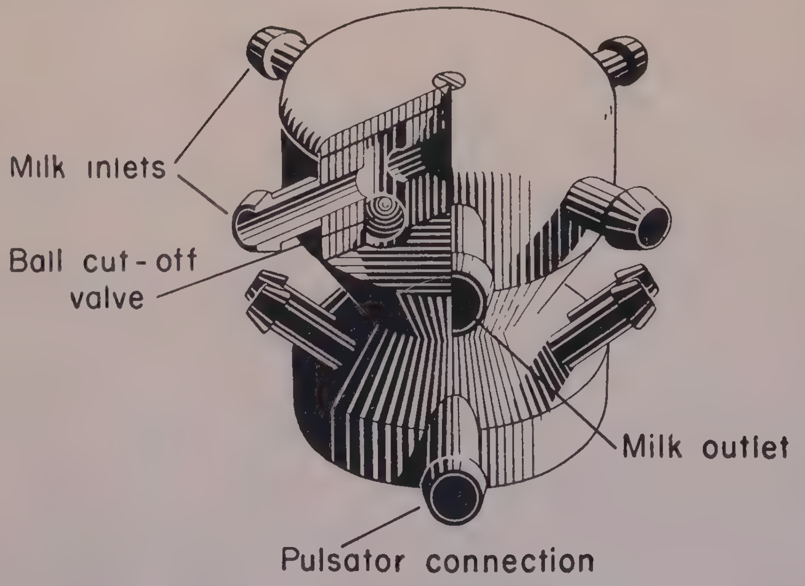


Fig. 1—Sectional view of a trial model of the ball cut-off type of claw.

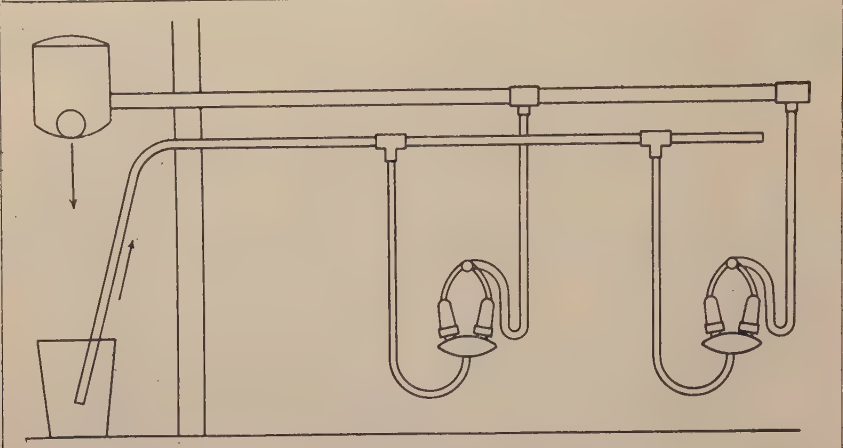


Fig. 2—Schematic drawing of the simple circulation washing system, which can be used with any type of milking plant.

This system permits the wash solutions to be circulated in either direction, providing either a steady full flow in the milk pipes and cups or a violent, turbulent flow. The advantage of this is that the full flow can be used for soaking or for subsequent sterilising, and the turbulent flow to give a violent scrubbing action to dislodge the already softened deposits. This system also provides a placing of the releaser pulsator which allows water to flow through this unit during one of the washing phases.

Another development is the ball cut-off claw specially designed for circulation washing. A cut-away drawing of a trial model of this claw is shown in Fig. 1. This model was tried out at Ruakura 2 years ago and the principle appeared very promising. The claw uses small stainless steel balls in pockets drilled at right-angles across the milk inlet nozzles.

When air is allowed to enter the teat-cup the ball is lifted very rapidly into a seat formed in the vacuum side of the inlet nozzle, thus effectively shutting off the vacuum to the teat-cup. The seat on which the ball rests is slotted in a way which permits a small air leak, so that when the teat-cup is subsequently placed on the cow's teat a vacuum is formed rapidly in the cup and the ball falls off the seat to the bottom of the pocket.

With such a system claw rubbers do not need to be folded over and even an unskilled milker can put cups on without wasting air. The cups slip on to the cow's teats very easily in a way which does not cause discomfort or surprise to the cow. There is no risk of the dirt or water from the bail floor being drawn into the cups during application or during accidental falling.

The claw design is not new; it was developed over 25 years ago by a Mr Mason, Manawatu, under the name of the "Mason Automatic Claw", but for various reasons its use was not continued. The present development has been carried somewhat further and field tests indicate that the principle can be made to operate very effectively.

One of the most important advantages of this type of cut-off claw over the conventional system or the obliquely cut nozzle type is that there is relatively little risk of damage to the claw tubes, since the nozzle ends can be made with a rounded ferrule.

A commercial adaptation of the claw incorporates a system for circulation washing of the teat-cups. The claws, in the wash position, have a top cap swivelled to one side acting as a valve to make a connection through the teat-cups and jetting bracket between the milk and pulsator droppers. This method permits rapid switching to the wash position without the need for removing rubber connections. A further useful feature is the provision of vacuum bleed holes in the claw cap which allow the inflations to remain in the open position during washing so that the passage of the wash water is not restricted in any way.

These developments indicate that progress is being made toward simpler and more effective circulation washing.

Application of Circulation Washing to Existing Plants

It was realised that the method described above was applicable only to plants specially designed for it and that there was a definite need, once the method had been proved, to make available a system which could be applied to any type of milking plant. This problem has been given some thought at Ruakura over the past 2 years.

Last year one of the local manufacturing firms became interested in the problem and we were able to suggest various possible systems worth trying. A trial unit was made up and put on a farm for test under the supervision of the Dairy Division, Department of Agriculture. The plant has been in operation for a full season now and results have been excellent.

The principle of the washing system is very simple. A schematic diagram is shown in Fig. 2. The cowshed is fitted with a metal or plastic pipeline which runs the length of the shed along the facia board. The end near the releaser is left free and can be placed in a bucket of washing water beneath the releaser when the plant is to be washed. In each bail a T-piece connects to a plastic or rubber hose which hangs down into the bail. Each bail is also fitted with a jetting bracket to which the teat-cups are attached during the washing. To wash the plant the teat-cups are placed on the jetting nozzles and the bail hose is connected to a nozzle on the base of the bail jetter. The free end of the line at the releaser is then placed

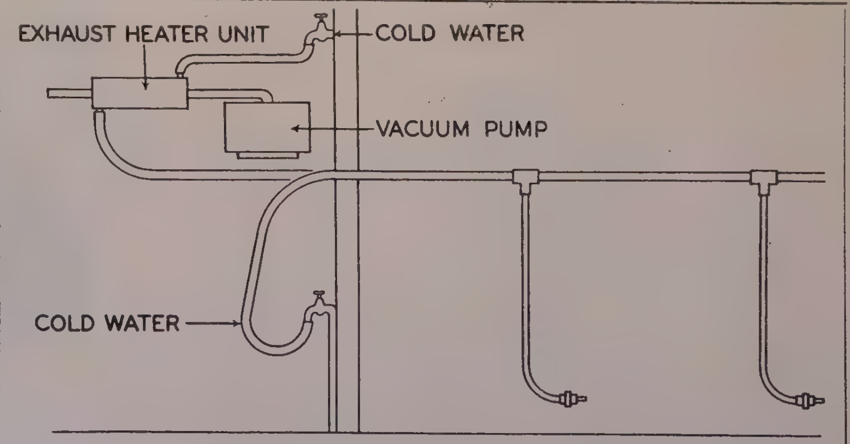


Fig. 3—The "wash line" passing down the shed is shown here being used for teat washing during milking. The water supply can be taken from a cold tap or some type of heater.

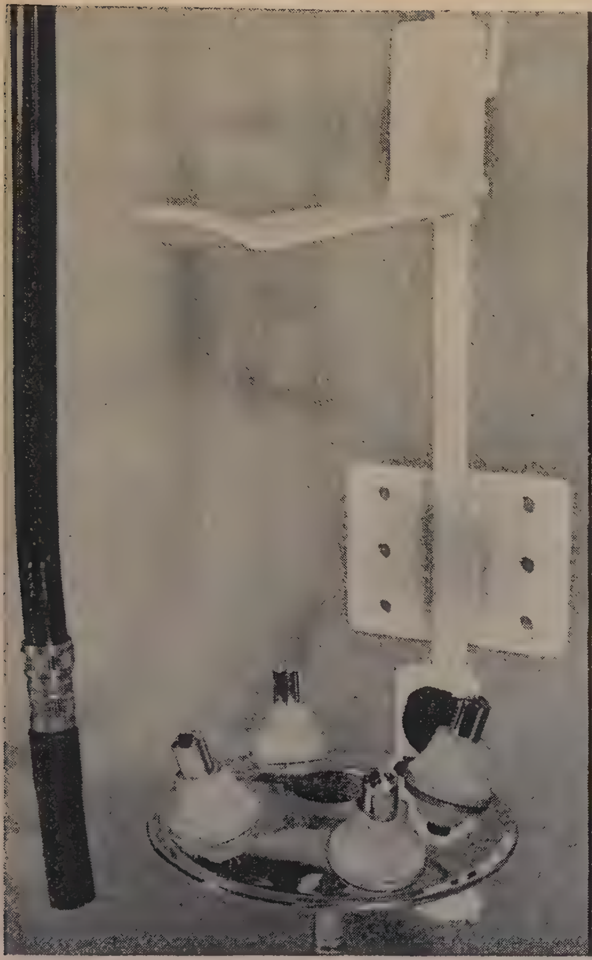


Fig. 4—The teat-cup jetting unit and bracket and the teat-washing hose with its tap.

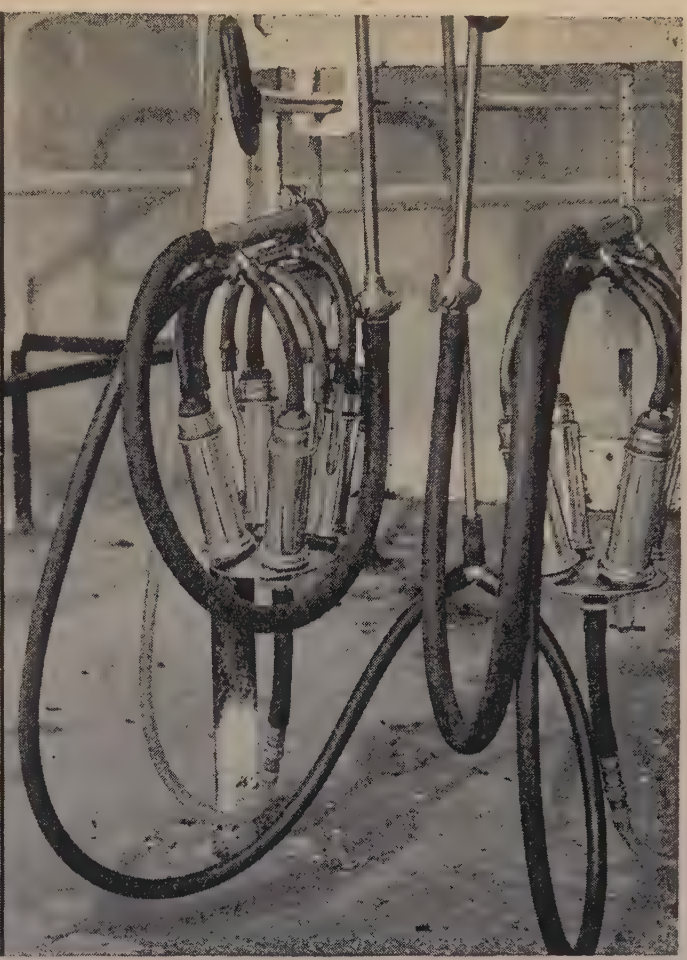


Fig. 5—Teat-cup jetting units with teat-cups attached ready for washing. Note the wash hoses connected at the bottom.

in the bucket of cleaning solution and the water is drawn through the plant by vacuum and discharged at the releaser, where it re-enters the bucket and is again circulated round the plant.

The circulation system is the same as that used in the Ruakura plant except that a separate pipeline instead of the air line, is used to take the water down the bail.

This would be an expensive arrangement were it not for the possibility of making this same pipeline serve a dual purpose. This is illustrated in Fig. 3, which shows the system used to supply running water to the bails for teat-washing during milking. Each hose in the bail is fitted with a small quick-acting hose tap and has a short piece of rubber tube on the end to act as a nozzle and to connect to the cup jetting unit for machine washing.

The system is extremely simple to install and use and yet has all the advantages of the full-scale washing system. It can be used with any type of plant and is readily adaptable to any type of shed. Using plastic piping where possible and a low-cost cup jetting unit, it is relatively inexpensive and can be installed easily by the handyman farmer.

Teat-cup Mounting Brackets

The teat-cup jetting units and the teat-washing hose are shown in Fig. 4. The jetter is in the form of a circular metal chamber with the four teat-cup jetting nozzles on the top and the single nozzle for the connection of the hose at the bottom. This unit is supported in a steel mounting bracket which provides a rotatable arm to permit the jetter to be swung back into the dummy bail during milking, and also a bracket to support the cups when in the washing position, or for use during milking as a convenient hook for the teat-cups.

The use of a jetting unit of this type, with projecting nozzles to enter the mouth of the teat-cup, seemed at first to be a disadvantage, but trials indicate that there is sufficient leakage at the mouth of the teat-cup during washing to wash the mouthpiece very effectively.

Fig. 5 shows the jetter units in the washing position with the teat-cups in place ready for washing. The bail-washing hose is shown connected to the bottom of the unit. The hose tap is turned on when the vacuum has been established in the teat-cups.

Results of Tests

Trials have been carried out in two sheds for the past season and the system has proved to be extremely effective. The farmers concerned have been greatly impressed by the saving in time and trouble which the system has made possible.

During the test period the plants were carefully studied by officers of the Dairy Division, whose services have been invaluable in assessing the effectiveness of the system.

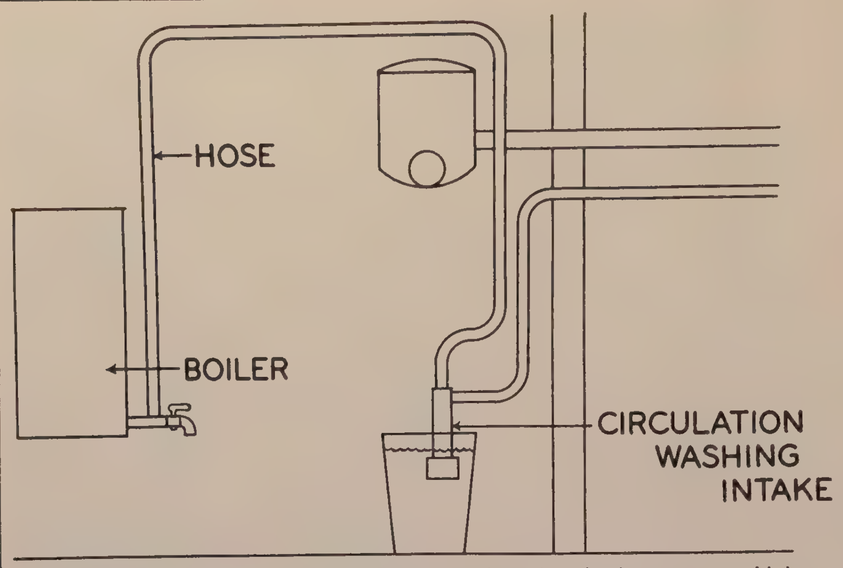


Fig. 6—With the use of a float-operated intake valve the hot water could be taken directly from the boiler so that temperature losses could be reduced.

Importance of Good Teat-washing

Fig. 3 shows that the water for teat-washing can be taken from the normal cold supply by connecting the free end of the main pipeline in the releaser room to the nearest cold water tap. The use of running water as a teat wash has a number of advantages. It is easily handled in the bail and the hose can be directed to make the most effective use of the time spent on washing. The water is always clean and does not become contaminated with mud and bacteria as does a bucket of water.

Additional features are the more regular washing action resulting from the use of a hose in each bail and the elimination of the transference of infections from one cow to another on the cloth used for teat-washing.

Use of Hot Water for Teat-washing

The water supply may be taken from any source of warm or hot water available. One attractive possibility which has been made available recently is the use of a water heater in the exhaust pipe of the vacuum pump. This unit consists of a small, inexpensive heat-exchanger which is fitted to the pump to extract waste heat from the exhaust air. This is illustrated in Fig. 3. The device was invented by a farmer in Taranaki and has been under test for the past year. In an average-sized cowshed this heater unit will raise the washing water temperature by as much as 10 degrees C. when the rate of use is 1 pint a minute, thus raising the water to a comfortable temperature.

A small increase in temperature such as this can be very helpful in the cowshed, since it makes the wash and stimulation procedure much more pleasant for the milker and is, therefore, more likely to ensure that this very important operation is carried out regularly even on cold winter mornings. The direct effect on the cow is probably much less important.

The importance of the wash and stimulation in milking has been demonstrated at Ruakura in a recent experiment conducted by W. G. Whittlestone. In this experiment pairs of twins were split so that one of each set was subjected to a normal wash and stimulation before milking while her mate was not washed or stimulated before the cups were put on. Over the full lactation, the herd of 10 cows showed an average difference of 18 per cent. in favour of the ones which were washed in the normal way, and the maximum difference for a pair was 36 per cent. It appears, therefore, that the use of a good wash and stimulation is essential for high production. The use of a warm-water wash, by making the wash process more pleasant on cold mornings, can help materially in ensuring the regular wash required for maximum production.

Permanent Connection to Hot and Cold Water Systems

One of the most annoying features of the washing of the milking machine seems to be the need to wait while buckets are filled with water from the boiler tap. Consequently buckets are frequently filled when some free time is available, and as a result are often left to stand for some time, resulting in loss in temperature.

The process could be made much more convenient and effective if the hot water supply were available through a pipe at the releaser end of the machine. It would then be a simple matter to run the hot water directly into the bucket as the circulation process gets under way. This could be accomplished very readily with a device such as that illustrated in Fig. 6, which consists of a small chamber to act as a detergent dispenser and a float-operated valve to shut off the boiler supply when the bucket is filled to a suitable level.

With a device of this kind the filling of the bucket would be automatic and the detergent cycle could be completed without further attention. In a similar way the boiling rinse could be carried out with the water taken directly from the boiler so that no heat losses occurred before it entered the plant. This could be very important, as a recent survey by M. J. McFetridge and Whittlestone (the "Journal", April 1958, p. 349) showed that, in all cases, the temperatures achieved in milking plants were considerably below the boiler temperature.

It is also clear that the cold water connection for teat-washing and initial rinsing of the milking plant can be connected permanently to the wash line down the shed through a suitable tap so that the change from cold water to hot water can be made simply by turning the appropriate tap at a convenient place near the releaser.

Summary

From the point of view of washing efficiency the simple circulation system described is quite as good as the full-scale system, in that it provides a circulation rate of 5 to 6 gallons per minute and additional turbulence produced by the pulsation of the inflations. If plastic pipes and hoses are used, the heat losses caused by heating up the plant are extremely low. The fact that the pulsators continue to operate is useful in that it causes the inflations to open and close during the wash and thus increases the washing of the inflation and reduces the obstruction to the water flow.

With a few refinements such as those mentioned, the system described can be made extremely convenient. Trials to date suggest that it can result in considerable savings in time and effort, and this, combined with the improved washing of the plant and the more convenient teat-washing arrangements —all at a moderate cost—make it a very attractive proposition.

Acknowledgments

The assistance of W. G. Whittlestone for valuable suggestions, M. J. McFetridge of the Dairy Division for his interest and cooperation, Messrs R. Pike of Kaponga and J. Pike of Matangi for testing the system, and Mr J. K. Graham of Waikato Brass Founders for his interest and cooperation is acknowledged.

Seasonal Notes for the Domestic Beekeeper

Handling the Honey Crop

By D. A. BRISCOE,
Apiary Instructor,
Department of Agriculture,
Tauranga

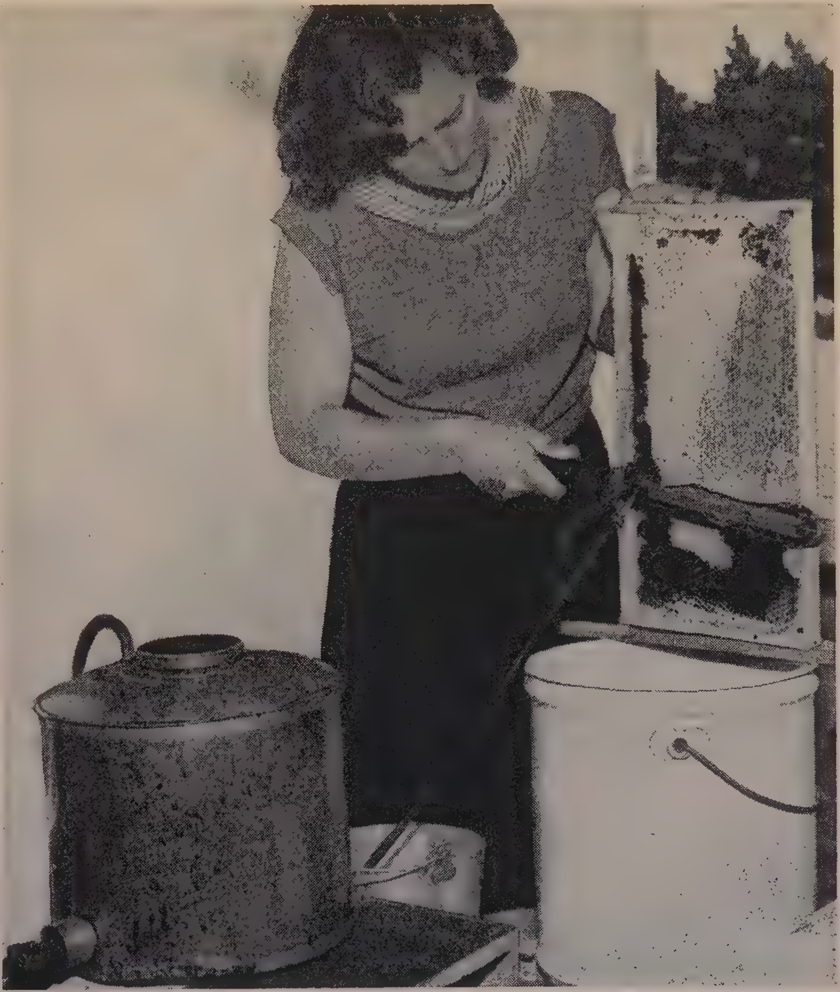
HANDLING the honey crop from a domestic apiary is not a big undertaking. It can usually be managed in a couple of hours and does not need a lot of expensive material and equipment. A small, 2-frame reversible extractor and a steam-heated knife and small electric boiler to supply the steam are at most all that is generally required.

FROM the time the honey supers are placed on the hives the beekeeper anxiously awaits the time when he or she can go to the hive and find the combs completely filled and capped over and ready for extracting. Even to the commercial beekeeper there is an air of well-being and satisfaction when a hive is opened during or at the end of the honey flow and the full combs of honey are exposed.

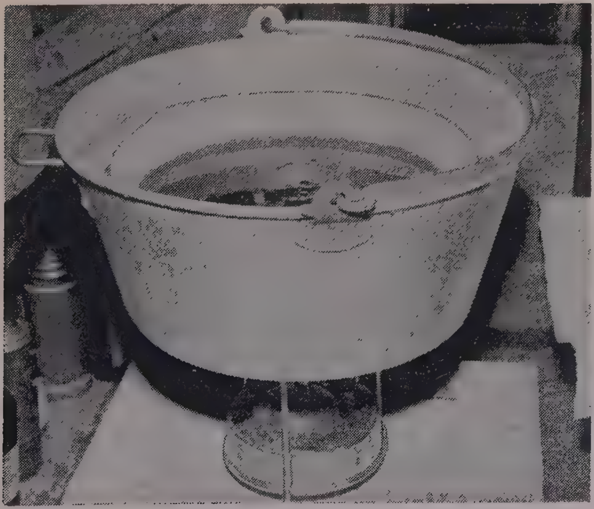
As each comb weighs 5 lb. or more according to the density of the flow and consequent size of the combs, it can be appreciated that a complete super of combs of honey takes a lot of lifting. The contents of a super at that stage must be handled with care, as otherwise the combs become damaged and broken and extracting becomes much more difficult.

Removing Combs

Lifting a super of honey from the top of a two, three, or four super hive is too much for some domestic beekeepers, especially women. It can be made easier by using an empty super on a hand barrow beside the hive. One comb of honey at a time is taken from the super on the hive and the bees gently brushed from it before it is placed in the empty super on the barrow. The process is continued until all the combs of honey have been removed from the super. The empty super can then be easily taken off the hive or replenished with another set of combs.



▲ Uncapping a comb of honey with a steam-heated knife. At left is the small electric boiler which supplies the steam.

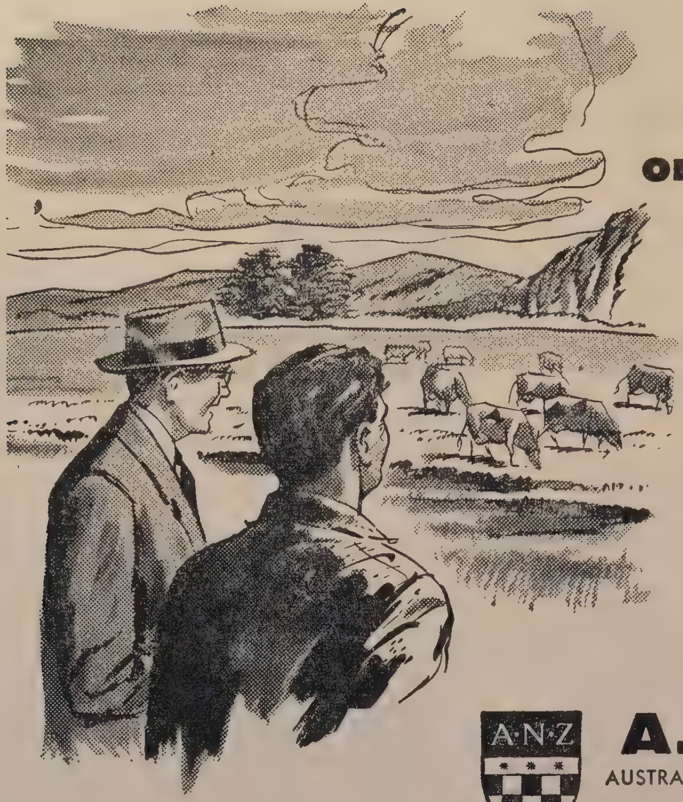


← Simple method of warming honey: a basin of honey in a container of hot water. Heat should not be applied directly to the honey.

[*Rendells photos.*

If there are no spare combs, the original combs should be extracted and returned as soon as possible. These combs should be put back on the hive only if the honey flow is still in progress.

Uncapping combs of honey with a steam-heated knife is not difficult. With a little practice the combs of honey can be uncapped without cutting too deep. The knife should be held and used at an angle that allows only the cutting edge of the blade to come into contact with the comb of honey. If this is not done, the knife will lose too much of its available heat and tend to drag rather than cut, with



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the result that the comb is not uncapped cleanly.

Extracting

Two uncapped combs are placed in the wire baskets of the honey extractor and then spun at a moderate speed for ½ minute or so. The machine is then stopped, the baskets are reversed, and the procedure is repeated.

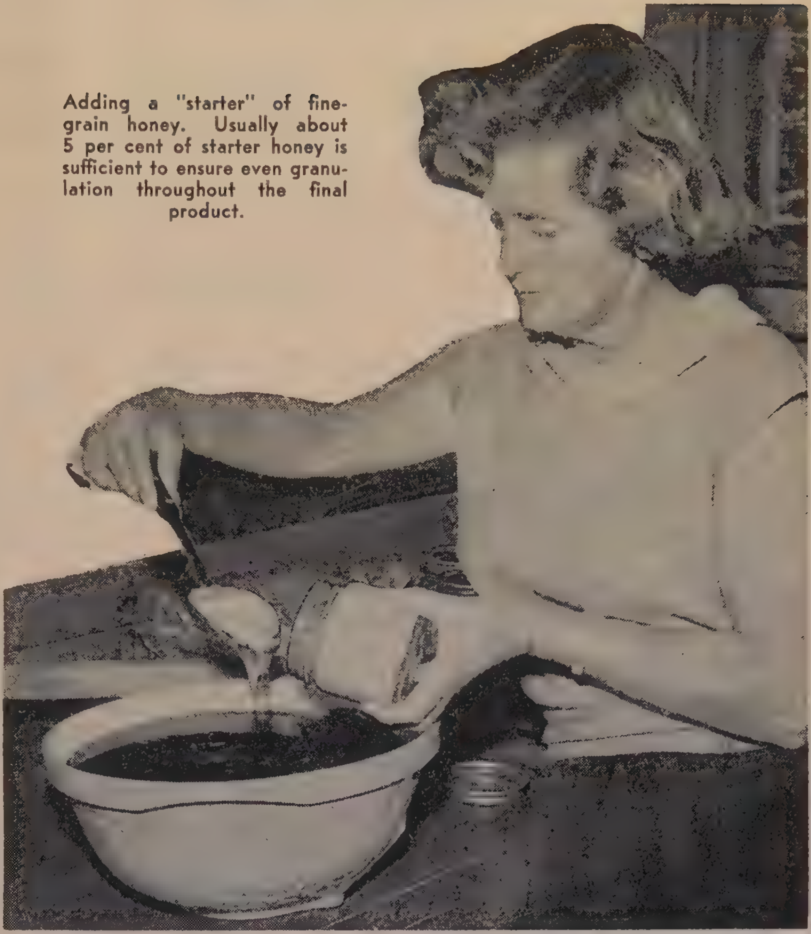
It is a mistake to spin the extractor at speed in an endeavour to throw all the honey from one side of the comb before reversing the baskets. If this is done, the combs will frequently break under the uneven weight. About half the honey must be thrown from each side of the comb before the extractor is turned at full speed. If the work is carried out in this way, the maximum amount of honey will be retrieved and the combs themselves will receive little or no damage.

The extracted honey is then usually warmed to facilitate straining. A simple way of doing this is to place the container of honey (whether it is a basin or 60 lb. tin) in a larger container of hot water. As honey is not a good conductor of heat, it will have to be given an occasional stir.

The honey should be allowed to come to a temperature of between 90 and 100 degrees F. It should then be strained through butter muslin, nylon, or similar material.

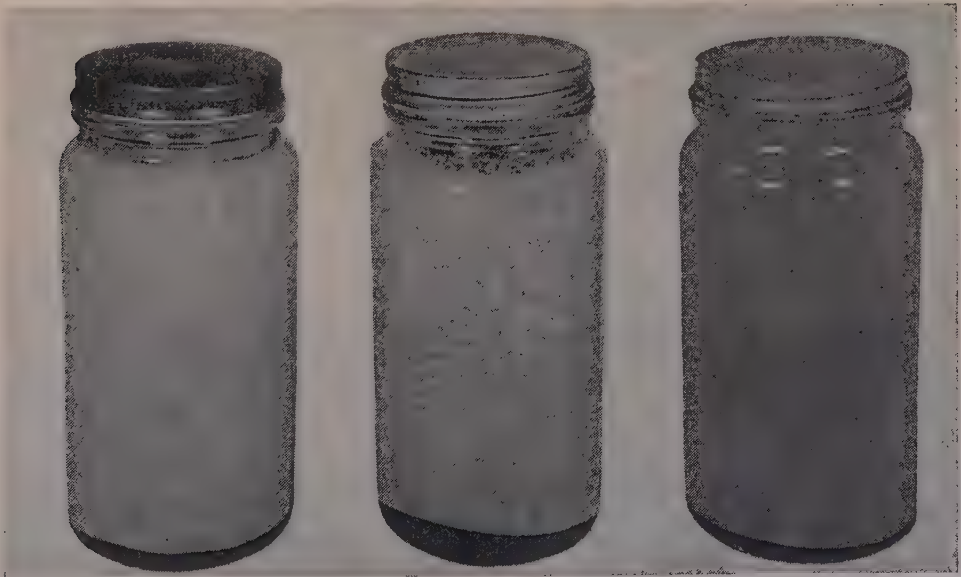
On no account should direct heat be applied to honey.

Once the honey has been strained and allowed to cool the scum that will form on the top can be removed. This scum is minute air particles and pieces of wax that have passed through the strainer and the reason for heating the honey is to allow this material to come to the top more readily.



Adding a "starter" of fine-grain honey. Usually about 5 per cent of starter honey is sufficient to ensure even granulation throughout the final product.

[*Rendells*



Three conditions of honey. Left—With smooth grain. Middle—With coarse grain. Right—Liquid honey. If left for several months, this will granulate like the honey in the middle jar.

When the honey has been cooled and the scum removed a good starter honey (honey that has already granulated with a fine grain) should be added and thoroughly incorporated by continuous stirring. This will ensure smooth and even granulation throughout the final product. About 5 per cent of starter honey should be used.

The honey can then be packed in jars or other suitable containers. If possible it should be kept at about 50 degrees F. for a week or two. This will assist rapid granulation and tend to offset any natural tendency of some honey to granulate with a coarse grain.

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Breeding Romneys for Better Lambing Percentages

AT Ruakura a trial has been under way since 1948 with the object of establishing how the fertility of the Romney ewe may be affected by selective breeding. Some of the information which has been gained during the 10 years the trial has been in progress was presented in a paper to this year's Farmers' Conference Week by L. R. Wallace, Senior Principal Scientific Officer, Department of Agriculture Ruakura Animal Research Station, Hamilton.

THE investigation was started in February 1948. At that time there was at Ruakura a flock of about 1,000 ewes, for which individual lambing records were available for previous seasons. From these 1,000 ewes three small flocks, each consisting of 100 ewes and each with the same age distribution, were formed. They were called the control, high-fertility, and low-fertility flocks.

The ewes selected for the high-fertility flock were either animals which had themselves previously produced twins, or, in the case of the 2-tooths, animals whose dams had a history of twinning. In contrast the ewes chosen for the low-fertility flock were either animals which had not at any stage had twins, or, in the case of 2-tooths, had been bred by dams which had not produced twins. In the setting up of the control flock no attention was paid either to the previous lambing history of the ewes themselves or to that of their ancestors. From considerations of fertility the ewes of this group were, in fact, a random sample of the original 1,000 ewes.

Management and Selection

In the high-fertility flock all subsequent selection has been for a high incidence of twinning; in the low-fertility flock it has been directed against twinning. In the control flock no attention has been paid to twinning; selection has, instead, been directed solely toward effecting a general improvement in the quality of the animals as judged by appearance. The purpose of the control flock, as its name suggests, has been to provide a group of control animals; each year the difference in lambing percentage between this flock and the other two has provided a measure of the progress made in breeding for and against twinning.

From the beginning all ewe lambs have been reared. Replacements have been selected at the 2-tooth stage, by which time at least two lambing records have been available for the dams. In the high-fertility flock ewe and ram replacements have been selected from dams with the best twinning records, whereas in the low-fertility flock replacements have been chosen as far as possible from dams that have seldom, if ever, produced twins. In the selection of replacements for the control flock no attention has been paid to the fertility performance of the dams; instead the best-looking 2-tooths have been chosen.

No ewes in any flock have been culled until the end of their third lambing season. Then about half the 6-tooths have been culled, those with the poorest twinning performance from the high-fertility flock and those with the best twinning performance from the low-fertility flock. The culling carried out in the control flock at this stage has been on the basis of appearance without reference to fertility.

The size of each flock has now been increased to about 133 ewes.

Right from the start each flock has been strictly self-contained. A fresh group of 2-tooth rams has been employed each year; usually 6 rams have been used in each flock, 3 at a time, week about, so that the ewes should have had every opportunity of getting in lamb.

Except during the mating period the 3 flocks have been run together as one throughout the year and been subject to the same general management. Since the level of nutrition at tupping time can markedly affect the lambing percentage, stringent precautions have been taken each year to ensure that the 3 flocks were treated as similarly as possible during the period that they had to be separated for mating. The procedure followed has been to rota-

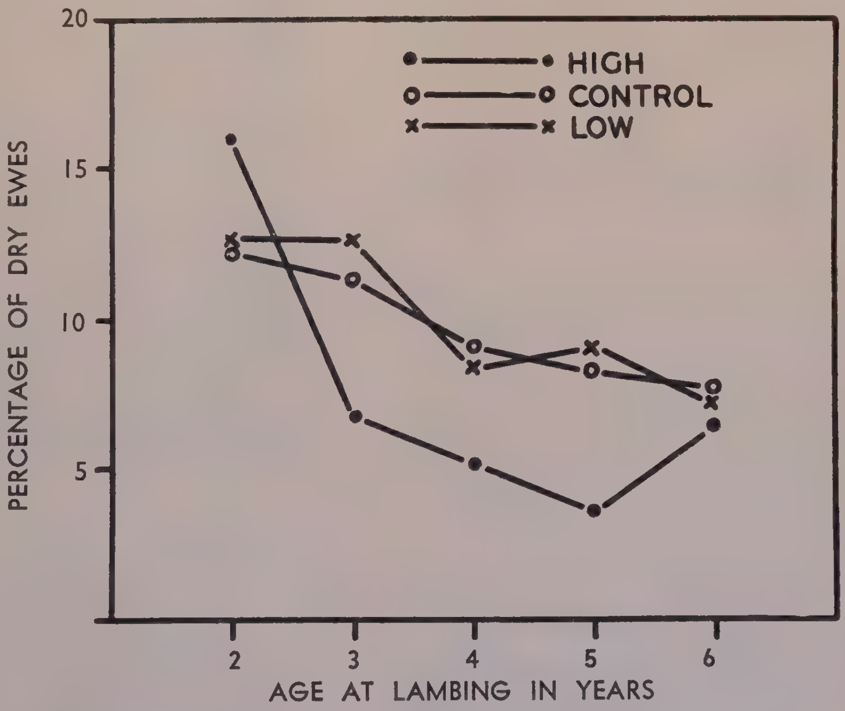

Fig. 1—Percentage of dry ewes at each age in each flock, 1948-57.

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tionally graze the 3 flocks over the same paddocks, each flock being shifted daily, so that no flock had the advantage of being grazed in a paddock better than the others.

Records Taken

All animals connected with the experiment have been weighed at regular intervals. At lambing the number of lambs produced by each ewe has been noted and the lambs caught, weighed, and tagged within a few hours of birth. Each year raddled teaser rams have been run with the ewes both before the introduction and after removal of the fertile rams in order to study the way the ewes came on heat at the beginning of the season and the number of ewes still returning to service at the end of the mating period.

The fertile rams have been introduced at about the beginning of March and left with the ewes for about 10 weeks. They also have always been regularly raddled. A complete record has thus been obtained of the mating history of each ewe in the three flocks over the 10 years that the investigation has been in progress.

Features of the Results

Lambing percentages can be calculated in various ways. The most important one from the practical farmer's viewpoint is what may be termed the effective lambing percentage, calculated by dividing the number of lambs docked by the number of ewes mated. This percentage is, however, an overall measure which is affected by three important factors which will each be considered separately. These factors are:

1. The percentage of ewes which fail to lamb.
2. The average number of lambs produced per head by the ewes which do lamb, and
3. The death rate before docking among the lambs produced.

1. Percentage of Dry Ewes

The proportion of barren ewes in each of the three flocks has varied considerably from season to season. Fig. 1, which is based on the combined data for all years, shows how the percentage of dry ewes varies with age of ewes in each of the flocks.

In general the incidence of dry ewes tends to decrease with age. The most interesting feature, however, is that whereas at the 2-tooth stage the percentage of dry ewes has been higher for the high-fertility flock than in either the control or low-fertility flocks, the reverse has been the case at the 4-tooth, 6-tooth, and later stages, when there have been only about half as many dry ewes in the high-fertility flock as in either of the other two flocks.

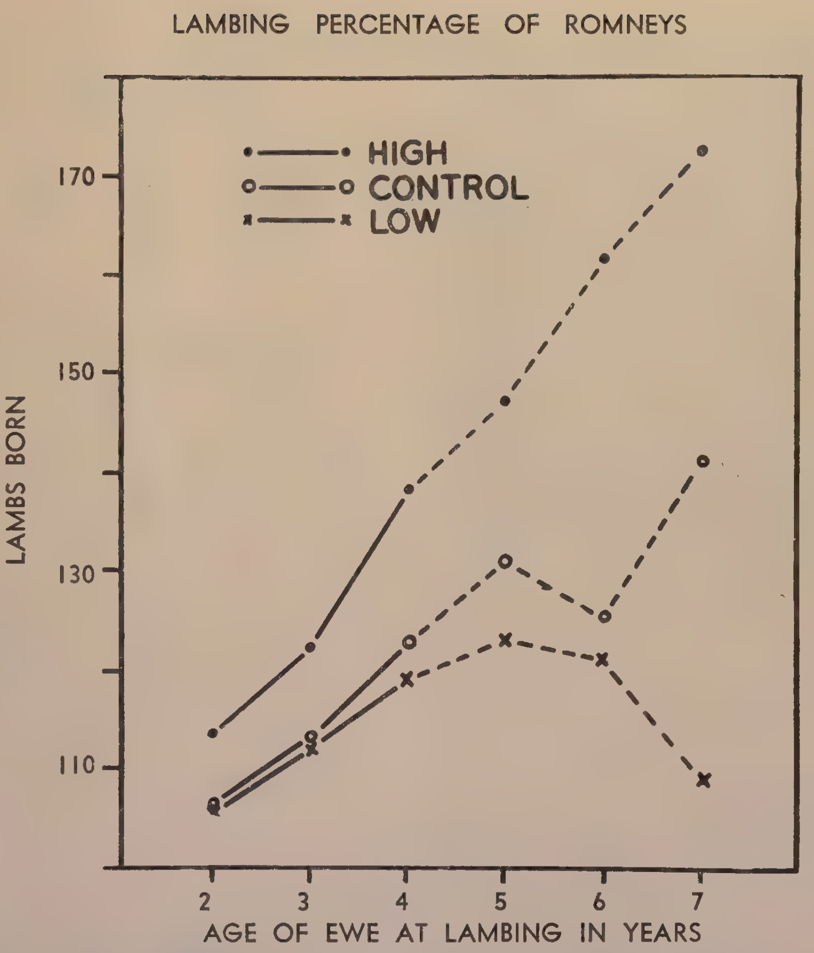


Fig. 2—Lambing percentage in the three flocks in relation to age, 1948-57.

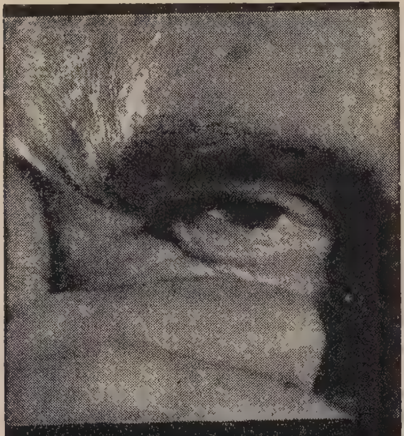
The reason for the comparatively large number of barren 2-tooths in the high-fertility flock is not definitely known. However, the fact that about 60 per cent of the replacements entering the high-fertility flock were born and reared as twins, whereas of the replacements entering the control and low-fertility flocks only about 30 and 15 per cent respectively have been twins, is rather suggestive. The performance of the single and twin ewes that entered the high-fertility flock is compared in Table 1.

TABLE 1—EFFECT OF TYPE OF BIRTH (SINGLE OR TWIN) ON SUBSEQUENT FERTILITY (HIGH-FERTILITY FLOCK)

	Single ewes	Twin ewes
Per cent dry as:		
2-tooths	12	21
4-tooths	7	8
6-tooths	7	5
Per cent of those lambing which had twins as:		
2-tooths	19	10
4-tooths	21	23
6-tooths	40	38

The figures show that, at the 2-tooth stage, the proportion of dry ewes among the ewes born as twins was double that among the singles, and also that the incidence of twinning was only about half as high among the twin 2-tooth ewes which lambed as among the singles. At the 4-tooth and 6-tooth stages, however, the percentage of dry ewes and the twinning rate were much the same for both classes of ewe.

It is well known that compared with singles twin lambs grow relatively slowly up to the weaning stage, and, indeed, tend to be still under weight when first mated as 2-tooths. This, taken with the results presented in Table 1, suggests most strongly that the rate of growth during early life is an important factor affecting fertility at the 2-tooth stage, though not at later ages. If this is indeed the case, it certainly emphasises the importance of breeding ewes capable of a high level of milk production, for the growth rate achieved, particularly by twin lambs, depends to a very great extent on the milk supply of the ewe, especially during the first 6 weeks.



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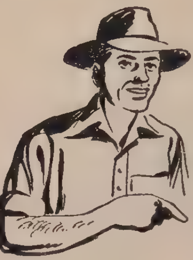

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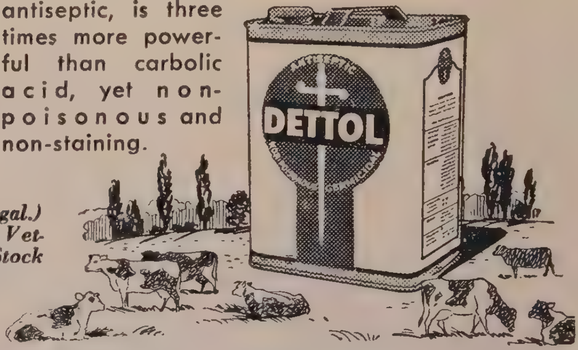

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The value of the lambing record at the 2-tooth stage, as an index of future breeding performance, is shown in Table 2.

TABLE 2—PERFORMANCE OF EWES WHICH LAMBED OR WERE DRY AS 2-TOOTHS

2-tooth record	Flock	Percentage dry as 4-tooths	6-tooths	Both 4-tooths and 6-tooths
(a) Dry	High ..	14	18	8
	Control ..	29	24	10
	Low ..	42	31	23
(b) Lambed	High ..	6	3	0.6
	Control ..	9	10	0.6
	Low ..	9	4	1.6

There are two points to be noted in Table 2. The first is that in each of the three flocks ewes which failed to lamb as 2-tooths were much more likely to be dry again as 4-tooths or 6-tooths or at both these ages than those which did lamb as 2-tooths. The second point is that there appears to be quite a real difference between the subsequent performance of the ewes that were dry as 2-tooths in the high-fertility flock and those of the other two flocks. Of the dry 2-tooths in the high-fertility flock only 14 per cent failed to lamb as 4-tooths, whereas of those in the control and low-fertility flocks 29 per cent and 42 per cent respectively were again dry as 4-tooths.

We have already noted that ewes which are dry as 2-tooths are rather prone to be dry again later in life. They have a further disadvantage. Even if they lamb, they tend to give a rather poor lambing percentage.

In all three flocks under study at Ruakura those ewes which were dry as 2-tooths but which lambed as 4-tooths and 6-tooths produced on average fewer lambs per head at these latter ages than ewes which had previously produced either singles or twins as 2-tooths. The situation in the high-fertility flock is illustrated in Table 3.

TABLE 3—LAMBING RECORD OF 2-TOOTHS AS AN INDEX OF SUBSEQUENT PERFORMANCE

Flock	2-tooth record	Average number of lambs as 4-tooth	6-tooth
High-fertility			
	Dry ..	1.13	1.29
	Single ..	1.23	1.41
	Twin ..	1.35	1.50

The results for these flocks run at Ruakura are rather different from those for the hill country flock run under much tougher conditions at Whatawhata, in which the proportion of 2-tooths which fail to lamb is a great deal higher. Broadly, I suggest that it is useful to regard dry 2-tooths as being of three kinds: those which are completely infertile, those which are inherently somewhat infertile, and those which fail to lamb simply because of the way they have been treated. If there are many dry 2-tooths, among them will be a large number which have failed mainly because in some way or other they have had a poor spin. They should, therefore, be given at least a second opportunity at the 4-tooth stage. If, on the other hand, there are only a few dry 2-tooths, a high proportion of them are likely to be either sub-fertile or completely sterile and the sooner they are culled the better.

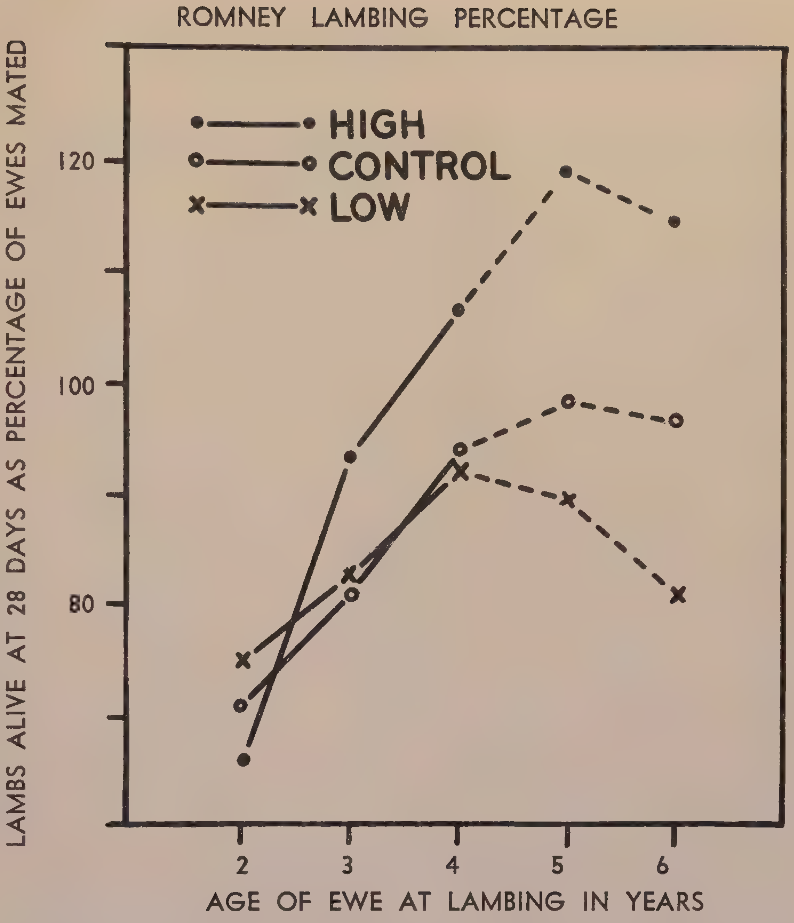

Fig. 3—The average difference in "effective" lambing percentage in the three flocks, 1948-57.

2. Lambing Percentage of Ewes that Lamb

Fig. 2, which gives average results over the 10 years, shows how the number of lambs born per 100 ewes lambing has varied with age in each of the three flocks. Since no culling for or against fertility has been carried out until after the third lambing, differences in fertility levels at the 2-tooth, 4-tooth, and 6-tooth stages are not due to culling, but provide a measure of the real inherited difference in fertility between the ewe replacements entering each of the flocks. In contrast differences in fertility level at the 5- and 6-year stages reflect both inherited differences and those brought about by culling after the third lambing season.

It is clear that the high-fertility, control, and low-fertility flocks differ appreciably in respect to fertility status. Thus, at the 2-tooth, 4-tooth, and 6-tooth stages respectively the lambing per cent (lambs born per 100 ewes lambing) for the ewes of the high-fertility flock has, over the 10 years, averaged 8, 9, and 16 per cent higher than for the control flock and 9, 10, and 19 per cent higher than for the low-fertility flock.

The selection originally practised and the fact that the lambing percentages have varied greatly from season to season make it difficult to assess accurately the rate at which improvement has been effected by breeding over the 10-year period.

TABLE 4—LAMBING PER CENT DIFFERENCE

(Lambs born/ewes lambing)

Age	High-fertility—Control 1st 5 yrs.	2nd 5 yrs.	High-fertility—Low-fertility 1st 5 yrs.	2nd 5 yrs.
2 ..	6	9	7	10
3 ..	7	11	8	12
4 ..	8	21	13	23
5 ..	14	18	18	29
6 ..	31	42	39	42

However, as may be seen from Table 4 the average lambing percentage differences between the high-

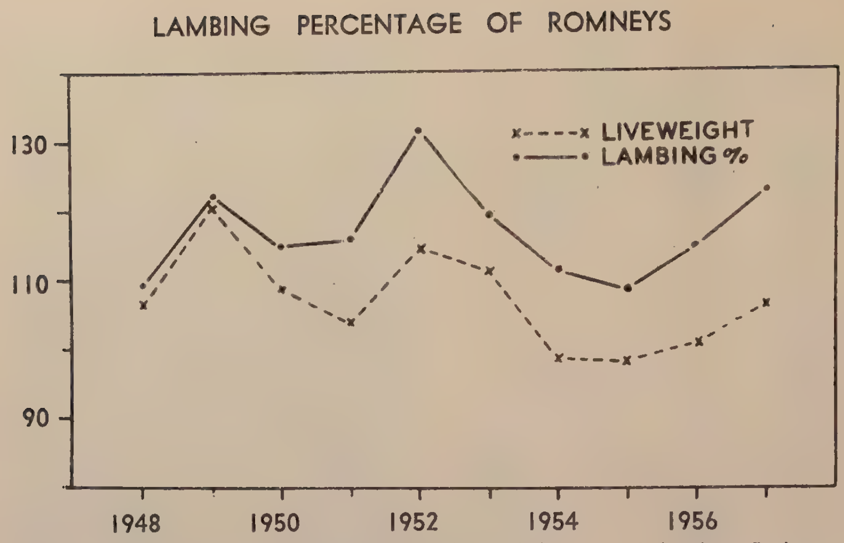

Fig. 4—Average liveweight and average lambing of the ewes of the three flocks over 10 years of investigation.

fertility and the other two flocks have, in general, been greater over the last 5 years than over the first 5 years, which suggests that progress is being made. The differences last year were greater than during the previous year.

3. Death Rate Among Lambs Born

The death rate among the lambs during the first 4 weeks is shown for each of the three groups in Table 5. The death rate was particularly high among lambs born to 2-tooths.

TABLE 5—DEATHS AMONG LAMBS

Stage	High-fertility	Control	Low-fertility
Birth ..	9.6	7.7	9.4
1 to 7 days	5.6	5.5	3.5
8 to 28 days	5.8	2.3	3.6
Total ..	21.0	15.5	16.5

The greater overall mortality in the high-fertility flock is associated with the greater proportion of twins produced in this flock.

4. Differences in "Effective" Lambing Percentage

Fig. 3 shows the average difference in effective lambing percentage, based on lambs alive at 28 days and ewes mated, between the high-fertility flock and the other two flocks over the 10-year period. On this basis the lambing percentage of the high-fertility flock has been slightly below that for either the control or low-fertility groups at the 2-tooth stage, but substantially above that of either of the other flocks at all subsequent ages. The reasons for the comparatively low effective lambing percentage of the high-fertility 2-tooths have already been mentioned—the high proportion of dry 2-tooths and the heavy lamb mortality.

To date selection for high fertility has been directed toward increasing the number of lambs born. Consideration is now being given to whether in future it would not be better to select on the basis of weight of lambs weaned. This would throw additional emphasis on the ability of the ewes to rear their lambs and to milk at a high level.

5. Condition of Ewes at Start of Mating Season

Wide interest centres on the relationship between the average liveweight of the ewes and the lambing percentage. Each year all the ewes have been weighed about the middle of February, about a fortnight before the fertile rams have been turned out with the ewes. Fig. 4 shows the average liveweight and the average lambing percentage of the ewes of the three flocks over the 10 years that the investigation has been in progress. The point is the way that the lambing percentage has followed the liveweight.

In those years when the ewes were heavy just before tupping, comparatively high lambing percentages have been obtained; in seasons when the ewes were light, lambing percentages have been relatively low. The relationship is not due to differences in the age composition of the flock in different years; in all cases the results shown are averages of the mean liveweights and lambing percentages of 2-tooth, 4-tooth, and 6-tooth ewes.

Practically it would appear to be exceedingly important that 2-tooths should be well grown and the remainder of the ewes in reasonably good condition before the rams are turned out, if good lambing percentages are to be secured. The results suggest that it may be very poor practice indeed to overdo the process of starving the condition off ewes after weaning, particularly if there is a danger that as the breeding season approaches the ewes may have to be shut up and fed short commons as a precaution against facial eczema.

It has been possible to cover only some of the points which have arisen out of this investigation. I do not want to leave you with the impression that I regard the procedures which have been adopted in this investigation the best that can be followed in practice in breeding for increased fertility. Obviously several modifications might be made to the present project which would speed up the rate of progress, and other breeding programmes could be employed.

The results so far obtained do show, however, that high fertility is a characteristic which can be improved by selective breeding. They also serve to emphasise that those who embark on an improvement programme must be patient and not expect an immediate dramatic increase in the lambing percentage of their flock, but rather to make steady but nevertheless thoroughly worthwhile gains over a number of years.

◆

COMMONWEALTH ECONOMIC COMMITTEE

Periodical Intelligence Services

Market Intelligence Services, providing regular comprehensive and prompt information on the supply and distribution throughout the world of certain commodities of particular importance in Commonwealth trade, are issued as follows:

Wool Intelligence (monthly).

Intelligence Bulletin (Dairy Produce and Meat) (Monthly with supplement "Weekly Dairy Produce Supplies").

Fruit Intelligence (monthly with supplement "Weekly Fruit Supplies").

Grain Bulletin (monthly, including the former "Rice Bulletin").

Tobacco Intelligence (quarterly, supplemented by the "Tobacco Bulletin" appearing in intervening months).

The subscription rates, including postage, are:

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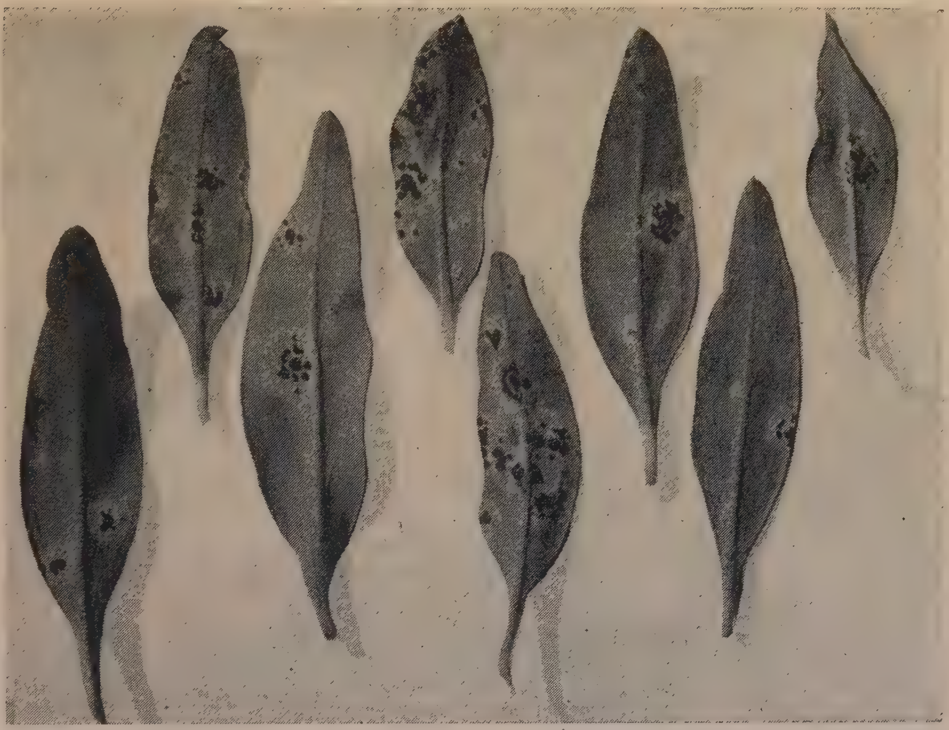
Grain Bulletin. £2 per annum including the Rice Supplement which can also be obtained separately for £1 per annum.

Orders for these publications should be sent direct to: The Secretary, Commonwealth Economic Committee, 2 Queen Anne's Gate Buildings, Dartmouth Street, London, SW1.

◆

Antirrhinum Rust in New Zealand

RUST disease of antirrhinums caused by *Puccinia antirrhini* Diet. and Holw. was first found in December 1953 on antirrhinum plants in Auckland and since then has been found in many other parts of New Zealand. Some details of work that has been done by the Horticulture Division of the Department of Agriculture on this problem are given in this article by R. Close, Scientific Officer, Crop Research Division, Department of Scientific and Industrial Research, Lincoln, and formerly Plant Pathologist, Department of Agriculture, Wellington.



Various stages in the development of rust pustules on the lower surfaces of antirrhinum leaves.

THE disease was first recorded in California in 1895 and within 20 years it had spread over the whole of the United States. In 1931 it spread to France, and was recorded in England in 1933. It soon spread over most of Europe, and in 1940 it reached South Africa. More recently it has been recorded in Norway, Tanganyika, Rhodesia, and Australia. The first record in Australia was made in October 1952 in a Sydney nursery, and within 18 months the disease had spread over most of Australia.

The main host is *Antirrhinum majus*, a native of the Mediterranean region, where the rust was unknown. It seems fairly clear that the rust was indigenous on some Californian species of antirrhinum. That it has found the cultivated antirrhinum to be a very suitable host is shown by the fact that it attacks it at all stages of its growth and greatly mars its appearance and reduces its vitality.

Effect of Disease

All the above-ground parts of the plant except the petals are attacked and the first sign of infection is usually small yellowish spots on the leaves. These spots soon produce many brown pustules of spores, first on the lower surface and then on the upper surface. These rust pustules are produced on the stem, leaf stalks, flower stalks, sepals, and capsules. Those on the stem are usually elongate and may girdle the stem.

The pustules contain uredospores (orange, summer spores), but later dark teleutospores (black, winter spores) are produced. The fungus overwinters on old antirrhinum plants, which produce uredospores in spring and these infect young seedlings. There is no known alternate host.

As with other rust fungi, various races of antirrhinum rust exist. Up till 1937 only one race was known, but in that year the more virulent race 2 was found in America, and this was able to attack all the varieties that were resistant to race 1. It is possible that other races of this fungus occur.

The causal fungus has been well described by Shirley D. Baker, of Plant Diseases Division, in the "Transactions of the Royal Society of New Zealand", volume 83, page 453 (1956). Reports received from Horticulture Division officers have shown that the spread of the fungus in New Zealand has been very rapid:

December 1953: Auckland, first record.
Autumn 1954: Hamilton, New Plymouth, Palmerston North, Levin, and Wellington.
October 1954: Blenheim.
December 1954: Christchurch.
January 1955: Wairarapa and Nelson.
February 1955: Gisborne and Hastings.
November 1955: Roxburgh.
January 1956: Dunedin.
March 1956: Invercargill.
April 1956: Gore.

The rapid spread within New Zealand would be mainly by wind-borne spores and by the distribution of infected plants.

In January 1955 plants of a *Linaria* species (most probably *Linaria maroccana*) were found in Wellington to be infected with antirrhinum rust. This record is also extremely interesting, for only once before have linaria plants been found to be naturally infected with this rust.

Conditions Favouring Spread

Climatic conditions throughout New Zealand thus appear to be ideal for the growth and spread of this particular rust. The optimum temperature for germination of uredospores and infection of antirrhinum plants is 50 to 60 degrees F., whereas the optimum for growth of the fungus is 70 to 75 degrees. Moisture is also necessary for infection to take place. It is fairly evident that antirrhinum rust is a warm weather disease.

Under conditions of high humidities and low night temperatures (50 to 55 degrees) combined with high day temperatures (70 to 75 degrees) the full cycle of the rust from infection to sporulation is completed about every 12 days. On the other hand very high day temperatures (90 degrees) and dry conditions retard the growth and development of this fungus.

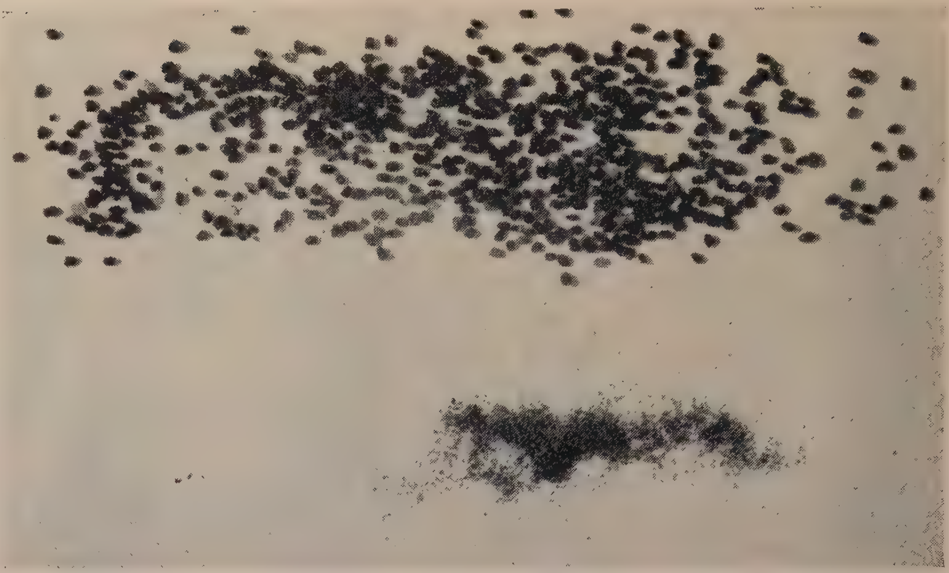
Secondary Fungi

Injury to antirrhinum plants is, under moist conditions, mainly due to secondary fungi. These invade the rust pustules destroying the rust and advancing into previously healthy host tissue, killing leaves and stems. In drier weather host injury results from the drying of rust-infected tissues.

How Rust Could Have Entered New Zealand

There seem to be two main theories on how this rust disease entered this country.

The first is by seed transmission. Large numbers of both uredospores and teleutospores can be seed-borne. Viability of the spores depends on temperature and humidity. Seed-borne uredospores if stored at low temperatures and humidities will remain viable up to 4 months and could therefore be an easy means of rust dispersal. Teleutospores remain alive for some time, but like many other rust fungi they cannot reinfect the original host, in this case, antirrhinum. They do not therefore constitute a hazard. In the autumn of 1954 several consignments of antirrhinum seed from England and the United States were examined and all were found to contain both types of spores.



Contents of a packet of imported antirrhinum seed. The "dust" below the seed is composed of uredospores and teleutospores.

These seed-borne spores could, if viable, affect seedlings in two ways:

(a) Directly; that is, seedlings raised from infected seed could become infected by the spores borne on or with the original seed.

(b) Indirectly; by the dusting of seed-borne spores on to adjacent seedlings when the seed was being sown.

The second way in which this rust could have entered this country is by wind from Australia. This theory seems to be a likely one because of the appearance of the rust more or less simultaneously in a number of localities throughout New Zealand. It is well known that dust can easily be blown across the Tasman Sea and it seems likely that the rust could have entered by this means.

It is also possible that spores of the rust could have been carried on travellers' clothing and thus could have entered from Australia in this way.

Control

Control of this rust disease can be attempted in three ways:

1. By good cultural conditions, thus preventing the fungus from over-wintering.

2. By the use of fungicides. In 1954-55 trials were carried out using the fungicides copper oxychloride, ferbam, and thiram. None of these materials proved satisfactory. Workers in several parts of the United States have shown that regular sprays with fungicides belonging to the ethylene bis dithiocarbamate group (dithane series) have given good control of the disease. Further research in New Zealand by Jacks and Webb (1955) confirmed this and also showed the value of a 75 per cent wettable sulphur as a control fungicide. To be effective, spraying must be carried out regularly at 10- to 14-day intervals.

3. By the growing of rust-resistant varieties. Resistance of plants to antirrhinum rust is controlled by a single dominant factor, so that a cross between a fully resistant plant and a susceptible one will yield 75 per cent of resistant plants and 25 per cent of susceptible ones. Modifying genes for resistance and the presence of two distinct races of rust make breeding work more difficult.

In the 1954-55 season, plants of Wisley Bridesmaid were grown to identify the race of antirrhinum rust present in New Zealand, and these became infected. Since Wisley Bridesmaid is a race 1-resistant variety, this confirmed the suspicion that the rust was not race 1.

Trials with Rust-resistant Varieties

In the 1955 and 1956 seasons, trials with rust-resistant varieties were carried out by the Horticulture Division at both Auckland and Wellington. Nine American varieties (Artistic, Campfire, Copper Shades, Loveliness, Pink Shades, Red Cross, Rosalie, Snow Giant, and Yellow Giant) were grown and these showed varying degrees of resistance to this rust, though all of them became infected.

Six varieties obtained from England became severely infected. These were Victory and Roselight and four of the strain 1-resistant varieties (Wisley Bridesmaid, Wisley Cheerful, Wisley Golden Fleece, and Watkin and Simpson's Pink Freedom).

Thus it is safe to assume that the antirrhinum rust in New Zealand is not race 1, but is similar to or identical with the American race 2. It is quite possible that both races are present.

Three varieties of linaria, *Linaria maroccana* (Excelsior Mixed), *Linaria* Fairy Bouquet, and *Linaria* Sutton's Special Mixture were raised and grown adjacent to antirrhinums, but none of these proved to be susceptible to antirrhinum rust.

New rust-resistant varieties of antirrhinums will be obtained and tested in this country. Until such resistant varieties can be found antirrhinums, except under climatically favourable conditions, will not regain their usefulness as bedding plants.

References

H. Jacks and A. J. Webb, "Glasshouse Tests for Control of Antirrhinum Rust", "New Zealand Journal of Science and Technology", vol. 38A, p. 309.

Good Stockmanship Pays: Avoiding Carcass Bruising

By E. NELSON,
Livestock Instructor,
Department of Agriculture,
Papakura

TO some, good stock sense comes naturally. In others, because of lack of experience or an indifferent approach, it is completely lacking. This article describes some of the aspects which go to make up this important quality in stockmen which is so essential to our animal industry.

THERE is no university or college where stockmanship is rewarded with a diploma or certificate. It is unfortunate that this is so, but it would be impossible at such an institution to stage many of the difficult situations and problems with which a stockman has to deal in his year-round activities on the farm.

The many thousands of pounds of meat which are rejected for export because of bruising are evidence that at some stage between birth and final slaughter at the meat works cattle have been mishandled. It may be an over-enthusiastic shepherd with a new stock whip who crowds a mob of timid cattle through a gateway, causing bruising which results in several carcasses being rejected; it may be the new driver of a stock truck who, lacking in experience and understanding, fails to check his load and to steady down his speed at corners on the long haul from the back country station.

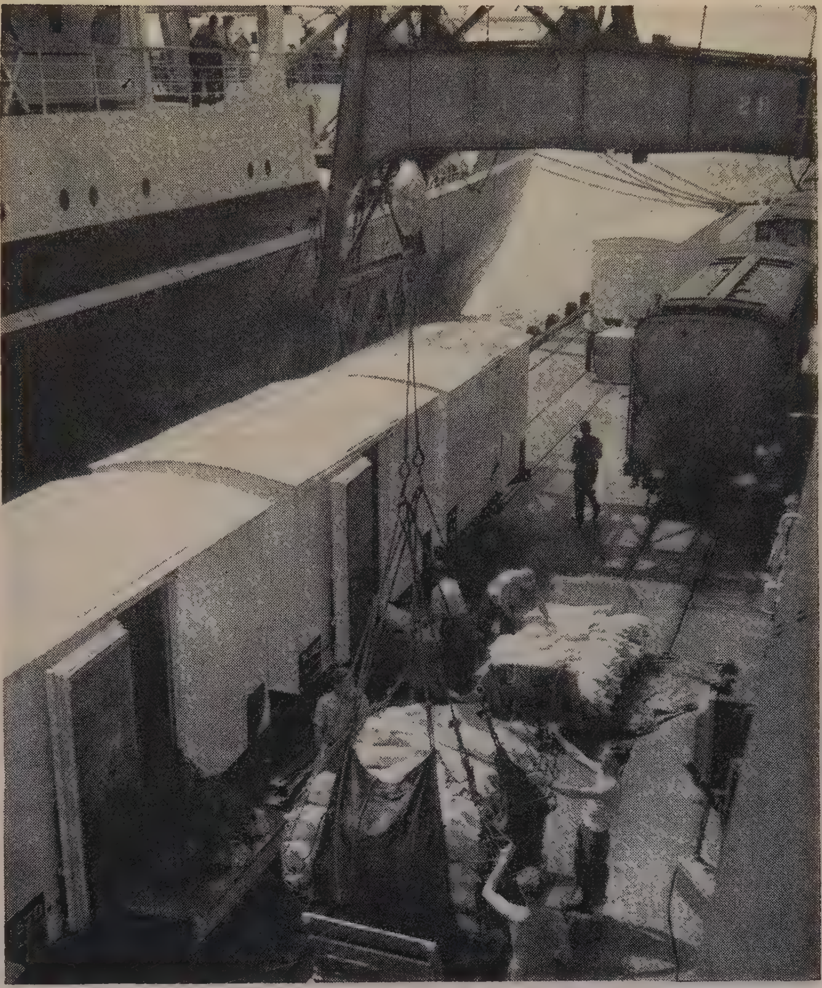
The Right Approach

Observation, anticipation, and patience are three qualities paramount in a good stockman. It is the possession of these qualities which enables one man to move livestock from one place to another with the minimum of fuss and bother. Another man, lacking in observation, may leave some behind, or lacking in anticipation lose some on the way. If he lacks patience, he may fail to arrive at his destination.

These three qualities are developed to a high degree in the successful deer stalker or pig hunter. A person who possesses these virtues is said to have "stock sense". Such a person knows instinctively to run up a hill away from an angry bull, knowing that the bull can run down hill faster than man.

Beef Cattle

Beef production is taking on new importance. Good handling and beef quality are inseparable. As it is almost impossible to handle a mob of wild or semi-wild cattle without causing some bruising, buyers will often avoid lines of timid cattle, knowing that the percentage of rejection through bruising will be high.



[*Sparrow*

Frozen meat exports earn a large proportion of New Zealand's overseas funds. Bruising of stock through mishandling at some stage causes rejection at works of large quantities of meat as being unfit for export.

The cattle fattener when making his purchases at store sales looks for quiet cattle. Cattle that are quiet will settle down quicker and being contented will fatten quicker. A cattle breeder who knows his business will get out among his stock as often as possible, moving them quietly round the paddocks until they are accustomed to seeing him. Such cattle will invariably command a better price at store sales.

The difference between animals which are rarely handled and those which are accustomed to being driven is well demonstrated by experience in New Zealand and South Africa with Merino sheep. In New Zealand Merinos are somewhat difficult to muster because under our conditions they are brought in only at long intervals. In South Africa, where they are yarded daily, Merinos are extremely easy to bring in and dogs are not needed.

Dairy Cattle

Patience and kindness are necessary in dealing with dairy cattle right from calfhood. A farmer who has these two qualities is able to go up to his cattle in the paddock and handle them. This situation of mutual trust between cows and farmer is invariably reflected in better shed behaviour, quicker letdown of milk, and faster milking. Heavy back chains and strong leg ropes are not needed with a contented herd.

All too often calves are brought in for feeding by dogs, fed by an indifferent milker, and chased back to their paddock. Such calves grow into dis-

PROFIT FROM IRRIGATION

An article, featuring this headline, appeared in the September issue of the "Journal of Agriculture". Outlining the experiences of a dairy farmer using modern irrigation methods in the Tauranga district, it gave positive proof of how he has been able to step up production, increase his income, and improve the value of his farm.

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If uneven rainfall, dry or drought conditions apply even for a short period every year in your district, irrigation may well be the answer to vastly increased production. Experts have stated that with farm production at such a high level today, soil moisture control can now be considered as one of the main factors in increasing yields.

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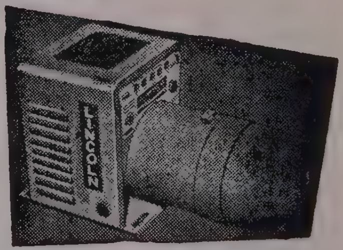

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trustful milkers. Women who tend calves at feeding time can give most men an object lesson in patience and kindness, and calves under their care and children's calf club calves have much to recommend them as future milkers.

Sheep Handling

Some of the many losses which occur on the sheep farm are due to poor stockmanship. Though today there is not the same amount of large-scale smothering which occurred when big mobs of timid sheep were crowded into a gully or dip in a fenceline, overcrowding in woolsheds and yards still results in much injury and smothering. The alert and observant shepherd will be quick to notice sheep in difficulty. Sheep penned overnight in a woolshed should have more room than is usually allowed sheep penned during the day.

Because sheep are handled more often than other meat producing animals, they are subjected to more bruising. It would pay farmers to take particular care when handling fat lambs at drafting and loading before dispatch to the works. Lambs are particularly prone to bruising. Inspection of bruised lambs after slaughter indicates that bruising over the shoulders and along the back is most common.

Lambs should never be lifted into or off trucks by the wool. This invariably results in a bad bruise. In like manner the backing dog, though useful and sometimes indispensable, at times has no place in the lamb race. The use of these dogs in this way can cause considerable bruising as well as pelt damage.

[*National Publicity*

Fat cattle crossing the Haast River in South Westland. Observation, anticipation, and patience are necessary virtues in the stockmen on the long drive to the saleyards with these cattle.

Though modern stock vehicles are well designed, care in loading and driving is still necessary to prevent bruising and injury during transport between farms and saleyards or freezing works.

Every year thousands of old fat ewes are trucked from farms to freezing works. They also are subject to bruising and should be afforded the same care as lambs.

Stock Trucks

Most of the vehicles used for stock transport are well designed and carefully constructed with no projections of timber or metal to cause bruising and injury. Floor construction provides a good footing for animals. Division gates are provided and their use protects animals from sudden jerking or swerving movement which otherwise would cause them to crowd to one side.

However, failure to drive with care can cancel out the best design features.

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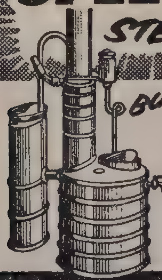
Thank you, Mr. M................. If K-16 meets a need for marking fat cattle we are very pleased to be able to pass on the good news, and your stock firm or hardware paint dealer will be happy to supply you.



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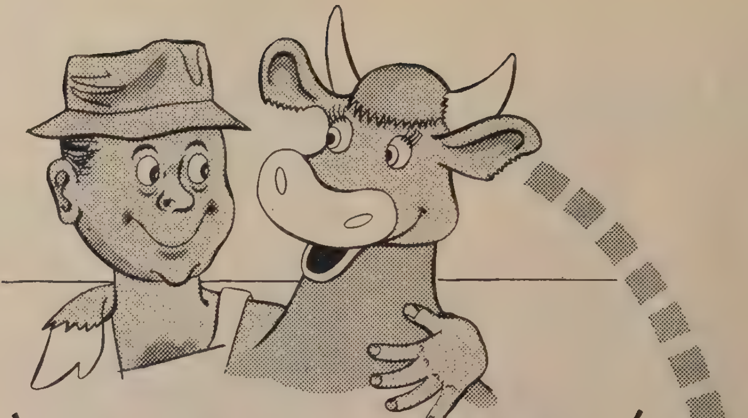

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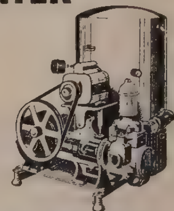

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READ THE LABEL—

If the container doesn't give clear instructions for safe handling, use, and first aid measures, turn down that product.

PREPARE FOR THE JOB

by wearing the correct protective clothing. Be sure you *cover up* from gloves to respirator or mask for certain jobs. The Departments of Agriculture, Health or Labour can advise on equipment.

KNOW THE DRILL—

Don't eat or smoke when working, poison may get on the face or mouth. Avoid spraying in windy weather. Serious absorption through the skin can occur if clothing becomes wet or if sprays are breathed in or swallowed.

WASH, WASH, WASH—

One of the most vital safety measures. Wash thoroughly before eating, drinking or smoking and bathe thoroughly after work. Then change into clean clothes and wash work clothes thoroughly,

CARE FOR YOUR EQUIPMENT—

Wash goggles and face-pieces of respirators (as well as other clothes used). Store the former in a clean, dry place, preferably in a tightly closed paper or cellophane bag.

GET A DOCTOR WITHOUT DELAY

at any sign of headache, dizziness, blurred vision, nausea, stomach cramps, tight chest. Give first-aid as outlined on the container.

DESTROY CONTAINERS—

Burn or bury them—well out of the way of children or pets.

10.8

Farmers buying in cattle to fatten do not want mobs of semi-wild animals. The wise breeder gets among his stock to allow them to get accustomed to men and become quiet.

The common causes of trucking injury are overloading, carrying weak cattle with more robust beasts, failure to partition off unruly horned animals, and failure to restrain bulls effectively. Apart from hygienic considerations, trucks should be kept clean if only to provide sure footing for their occupants.

Farmers should not ask carriers to overload, even if it means leaving stock behind. The potential loss from bruising and injury will be far greater than extra freight charges. The livestock carrying business is not an easy one. The carrier has many difficulties to contend with, not the least being inadequate loading races and approaches. Much bruising and injury would be avoided if farm loading facilities were improved.

Conclusion

The important points of good stockmanship can be summarised as

1. Observation, anticipation, and patience.
2. Frequent mustering of and movement among beef cattle so that they become quiet.
3. Patience and kindness with dairy cattle from calfhood so that they are well behaved in the shed.
4. Avoidance of bruising or other injury in sheep by extra care in woolshed and yards and at lamb drafting.
5. Careful loading and driving of stock trucks.

☆

Concentrate Esters of 2,4-D and 2,4,5-T

Correct Diluents and Proportions

THREE broad classes of esters of 2,4-D and 2,4,5-T are sold in New Zealand today. If farmers are to use these materials correctly, they should be aware of the following basic information:

Emulsifiable esters containing 3.6 lb. of acid equivalent per gallon

This type of ester under various proprietary headings has been on the New Zealand market for a number of years. Emulsifiable esters of 2,4,5-T, for example, have been used widely for gorse and blackberry control.

These materials are most suitably applied to the foliage of plants, water being used as a spreader or diluent. Their use in other carriers such as diesel fuel oil for basal spraying is not recommended, as the diesel fuel oil tends to separate out.

Concentrated emulsifiable esters containing 7.2 lb. of acid equivalent per gallon

Recently a proprietary line of 2,4-D and 2,4,5-T emulsifiable esters containing double the amount of acid equivalent (or active principle) has been marketed in New Zealand. Farmers using these materials should be aware of this and use them at the correct rates of application.

The Department of Agriculture's Bulletin No. 329, "Chemical Methods of Weed Control", gives all rates in pounds of acid equivalent per acre. These rates should be followed closely. In materials with 3.6 lb. each quart contains 0.9 lb. of parent acid; in materials with 7.2 lb. each quart contains 1.8 lb. of parent acid.

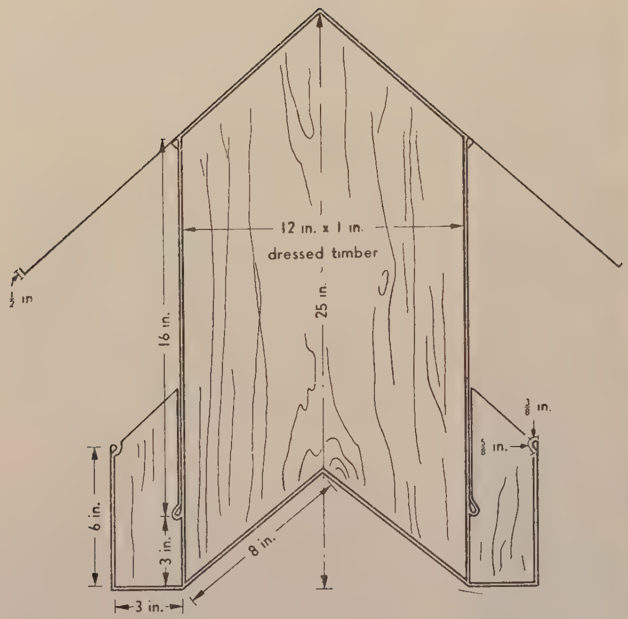
Emulsifiable products of 3.6 lb. of acid equivalent per gallon should be applied only in water.

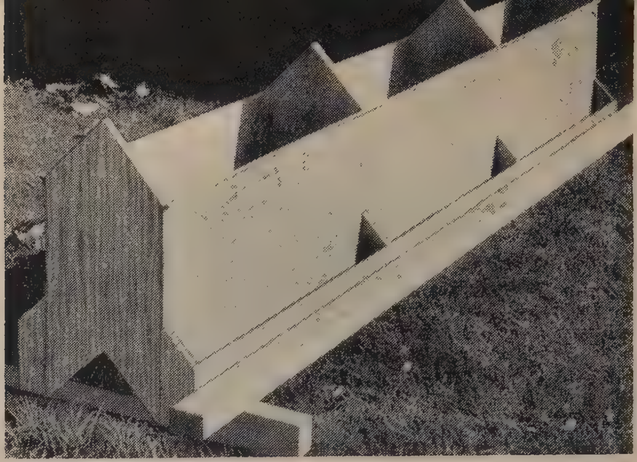
Oil-soluble ester concentrates containing 7.2 lb. of acid equivalent per gallon

These materials cannot be spread with water. They are specifically designed to be applied in oil carriers such as diesel fuel oil. They normally should not be applied to the foliage of plants, but used in the basal application method. In this method the materials are applied to the bases of plants such as hawthorn, barberry, and sweet brier. Diesel fuel oil acts as a carrier and penetrating agent.

Preparations of 2,4-D have been available for some years. Recently a proprietary line of 2,4,5-T has become available. Normally these products for basal application are applied in fixed solutions. A useful dilution is 1 lb. of acid equivalent in 10 to 20 gallons of diesel fuel oil.

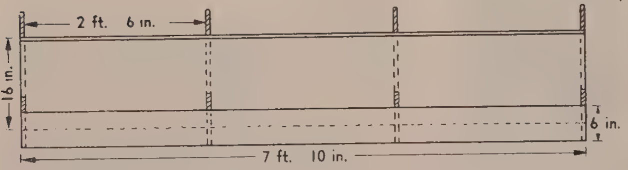
—*L. J. MATTHEWS,*
Weeds Research Officer,
Department of Agriculture,
Wellington

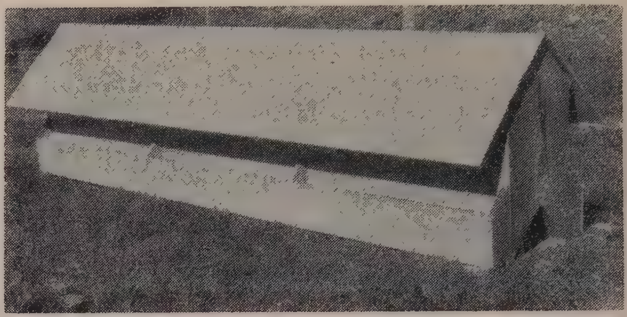




[*Alexander*

The hopper is divided into three equal compartments, the partitions acting as a support for the top. A platform is necessary for the young stock to stand on at the start, but this is later removed. Construction details are shown in the diagrams at left.





[*Alexander*

A Dry Mash Hopper for Poultry on Free Range

DRY mash feeding of poultry on the free range system, using the popular ark house or other types of housing where young stock are fed outside, presents some difficulties. The problem of keeping the mash dry in wet weather and from being blown about by winds can arise if a suitable hopper is not used. A hopper that will prevent wastage of expensive mash is described in this article by P. Josland, Poultry Instructor, Department of Agriculture, Wellington.

THE all-weather hopper described was designed by Mr B. Millar, poultry farmer, Masterton, and has proved an excellent feeder for young stock and adult birds alike.

Construction

The hopper is simple to construct, though the bending of the flat iron will present difficulties to most and its shaping would probably be better done by a plumber.

The material required is:

3 sheets of 8 ft. x 3 ft. flat iron
8½ ft. of 12 in. x 1 in. dressed timber
6 ft. of 4 in. x 1 in. dressed timber

Top of Hopper

The top of the hopper is made from a complete 8 ft. x 3 ft. sheet of flat iron and is easily removed when the mash supply has to be replenished.

Both sides of the top of the hopper are turned up ½ in. as shown in the diagram, and this will prevent rainwater from dripping on to the ground where the birds stand to feed.

Sides of Hopper

The sides of the hopper are cut 7 ft. 10 in. long and are 16 in. deep. The depth is reduced to 16 in. by bending the top and bottom edges 1 in. The top and bottom of the metal sides are rounded off as shown in the diagram.

Bottom of Hopper

The bottom of the hopper is made out of one sheet and is cut to a length of 7 ft. 10 in. and shaped as shown. The edges are rounded off in the same way as for the sides of the hopper.

The flat iron sides and bottom are made 2 in. shorter than the top hood to allow an overhang sufficient to prevent rain from seeping in and spoiling the mash.

The wooden ends should be protected by painting or soaking with a waterproofed compound.

The hopper is divided into three equal compartments and has a mash capacity of 300 lb. One hopper is used between two range shelters containing about 180 growing birds.

The mash flows freely and no trouble has been experienced with mash sticking, which it sometimes does in bulk mash hoppers.

The hopper sits on 1 in. blocks and for a start perch rails are necessary. They are removed as soon as the birds can reach into the hopper without them.

Poultry farmers who have built this dry mash hopper for use on free range find it efficient.

Main Advantages

The main advantages with the feeder are:

1. It is labour saving.
2. Wastage is reduced to a minimum.
3. All classes of stock can use it easily.
4. It can be constructed for use in a house. The top can then be reduced in size, as no over-hang is required.

MARKETING CUT FLOWERS

THOUGH flowers may not be considered of great economic importance in New Zealand, their production and the financial return received are important to a large section of commercial growers. Marketing of cut flowers is a specialised aspect of this work, and in this article J. P. Salinger, Horticulturist, Department of Agriculture, Wellington, describes the preparation of flowers for market and the requirements of each of the main markets.

THE marketing of cut flowers and pot plants has developed haphazardly, in contrast to the marketing of fruit and vegetables, which have for years been marketed in standardised containers, some prescribed by regulation. Many of the practices have been decided by tradition and convenience rather than by marketing authorities and the requirements of the flowers being marketed.

Cut-flower growing is an old-established industry carried out mainly by specialist producers who understand the growing of flowers and the requirements of the purchaser. There is still scope for further development of this industry if combined with other lines, but there is little prospect of financial success if garden surplus or flowers grown on speculation are marketed. Once a grower has become known for certain flowers, they should be grown and marketed every year, even if the price is low in one season. Cut-flower production, however, is not a quick and easy way to a fortune. The profit cannot be judged by the price of a bouquet from the florist. In this industry as in all others there are certain basic requirements:

- A good knowledge of the cultivation of the plants, including preparation for market.
- A consistent supply, either in the season or throughout the year, every year.
- A high standard of quality, regularly maintained with careful bunching and packing.

If these essentials can be achieved, a fair return will be received from the market whatever the weather, the supply, or the time of year.

Knowledge of cultivation: Details of the cultivation of individual flowers is outside the scope of this article, but certain rules apply to all flowers.

Growers' experience: There is no room in commercial horticulture for the grower without training and practical experience. It is the exception rather than the rule for an inexperienced new entrant to the industry to start from scratch and succeed; even an experienced home gardener finds difficulty in learning and adapting himself to commercial production. In fact a commercial grower is likely to be better as a home gardener than a home gardener would be in the commercial sphere, as he can adapt commercial techniques to the home garden, whereas home garden methods could seldom be applied to commercial practice.

Therefore the prospective commercial grower needs first to gain experience, preferably by working for at least one season with a good grower in the area. If this is not possible, the cultivation of flowers should be developed slowly in conjunction with other crops or by gaining full experience on small plots of flowers. It is easy to become careless in many ways, and unless the grower has a standard to work to, it will be very difficult either to improve methods of cultivation or to correct bad practices.

Some producers can grow good flowers, but fail in marketing. They tend to become absorbed in producing the flowers and to forget the ultimate purpose, which is to provide the market with the best material in the freshest condition. Good produce is often spoilt in cutting, packing, and marketing, but the reverse, that poor-quality flowers can be improved by good presentation, does not hold. In the preparation of flowers for market certain rules apply to all flowers, though handling and marketing of individual flowers vary.

The best cut flowers will come from plants that are well nourished and well supplied with water. It is seldom possible to cut quality flowers from plants which are dry at the roots or which have otherwise suffered from hot, sunny, or windy weather. The stems of the flowers are woody or thin, the flowers lack substance and size, and even if left in water for a long time before packing, they will not have the quality of those cut from vigorous plants, nor will they last as long after cutting.

Cutting Flowers

Flowers are tender and can suffer damage at any time while growing or being marketed; petals bruise badly even through one bloom pressing on the next and this damage may not show until the flowers reach the market. Even when large quantities are being marketed care should be taken at all stages.

Normally, flowers should be cut in the early part of the day, when the plants are full of water; alternatively, they may be gathered in the early evening as the heat of the day decreases. They should be carried so that the weight of the flower or flower spike is supported by the arm or the edge of the container, or they should hang down, but they should never be carried so that a bloom rests on the one below. Alternatively, buckets or

Soleil d'Or narcissus are bunched in twelves.

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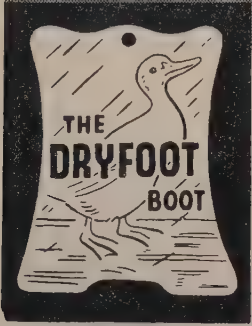

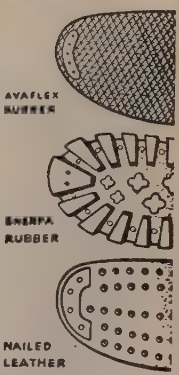

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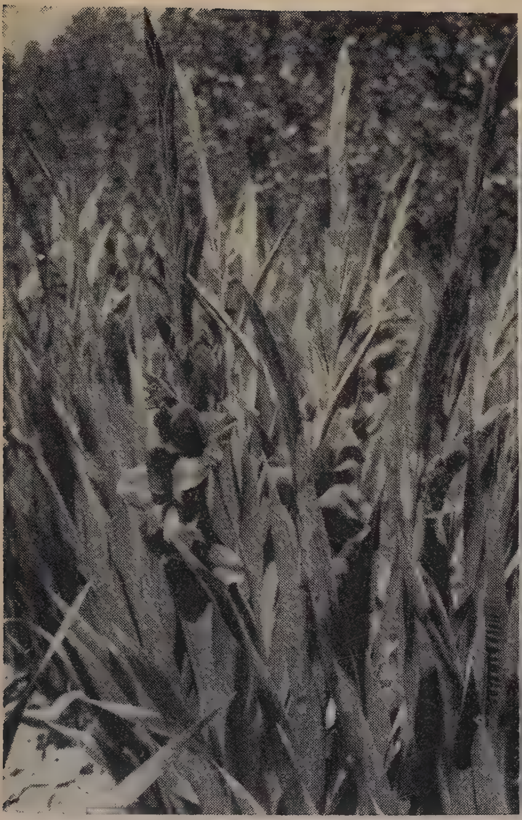
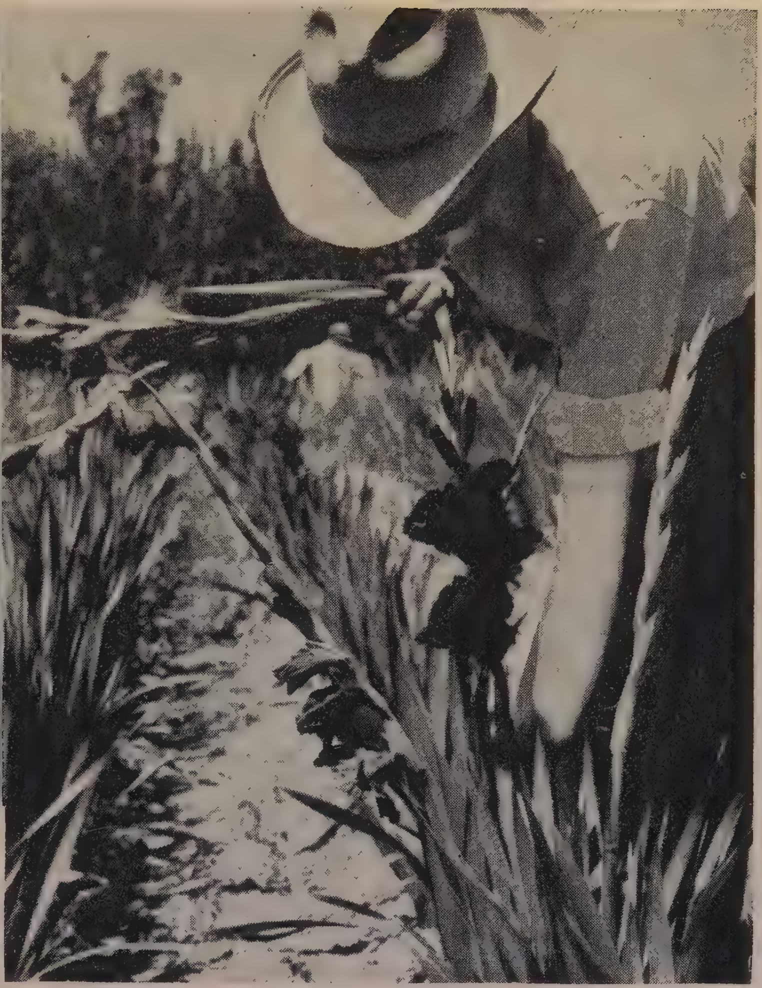


▲ Gladiolus spikes at the correct stage for cutting.



Cutting a gladiolus spike. The tip of the → spike is held firm in one hand while the knife is slipped down between the leaves with the other and the stem severed with an upward cut without damaging the leaves.

similar receptacles can be brought to the field and flowers placed upright in these containers.

As soon as possible after being cut the flowers should be taken from the field and set in containers of water in the shade or packing shed. On level properties where a large quantity of flowers is handled a trolley or light truck can be used. If flowers are carried in the crook of the arm by pickers, the lower bunches get damaged. Where a vehicle is to be used to bring flowers from the field to the shed, a framework should be designed to hold the bunches of flowers. Flowers laid flat loosely in boxes rub and bruise each other as the vehicle travels over uneven ground.

Some growers take the packing containers out into the field to carry in the flowers. Normally they do not take as many containers as will be needed for the final packing.

Layout of Packing Shed

The flower packing shed, whether it is a building designed solely for this purpose or not, must have adequate doorways, correct lighting, adequate water supply and drainage, enough covered space to hold empty and packed containers, and sufficient benches for bunching and packing.

Adequate Doorways

Doorways should be wide enough to allow boxes to be lifted in and out and to take a trolley, if this is used for carrying the flowers from the field. If left outside, flowers soon suffer from wind or hot sun; they should be brought under cover as soon as possible after picking.

The packing bench should be to one side of the door, so that wind will not blow directly on to the flowers. If the packing shed is used for other purposes, such as a garage, the bench can be hinged to a wall.

Correct Lighting

The shed should have adequate light, preferably from windows on the south side. Windows on the north side should either be shaded or have a deep overhanging eave to keep out strong sunlight. If window space is inadequate, additional natural light can be gained by inserting corrugated transparent plastic roofing sheets on the south side in place of the corrugated iron normally used for roofing. Artificial light will be needed in winter, fluorescent lamps or tubes being best. Their installation cost is higher, but running costs and the efficiency of these lights will soon offset the original cost.

Adequate Water and Drainage

As flower stems must always be placed in clean water, a plentiful supply of tap water should be readily available. Taps should be set along the wall, not in the centre of the floor space, and be 2½ ft. or less from ground level. It should be possible to place a container beneath the tap and turn on the water without its splashing out as the container fills. It should never be necessary to hold a container while it is being filled. Taps should be of good quality and kept in good repair; nothing is more unpleasant than a floor kept damp by a dripping tap. Where water pressure is very high a short

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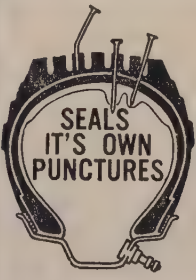

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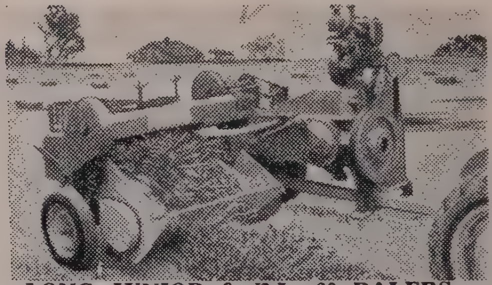

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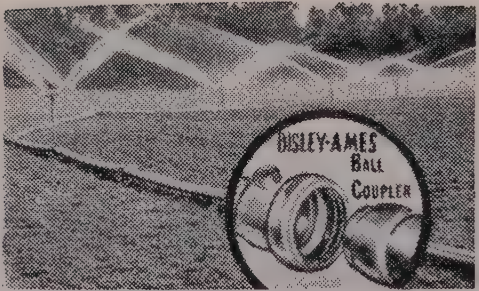

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length of hose should be attached to the tap.

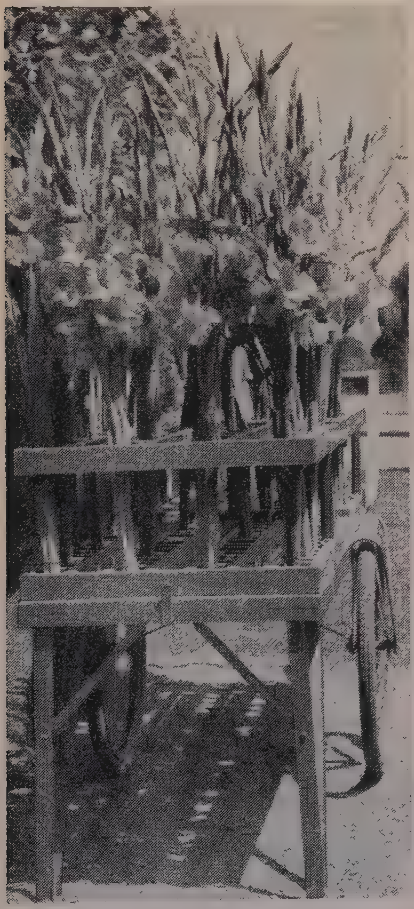
The drainage of the shed is closely linked with the water supply. There should be a large screened drain in one corner and the floor of the shed should be sloped sufficiently when laid to allow the water to run naturally to this drain. Preferably a channel should be run from the tap to the drain so that the floor is kept dry.

Storage of Containers

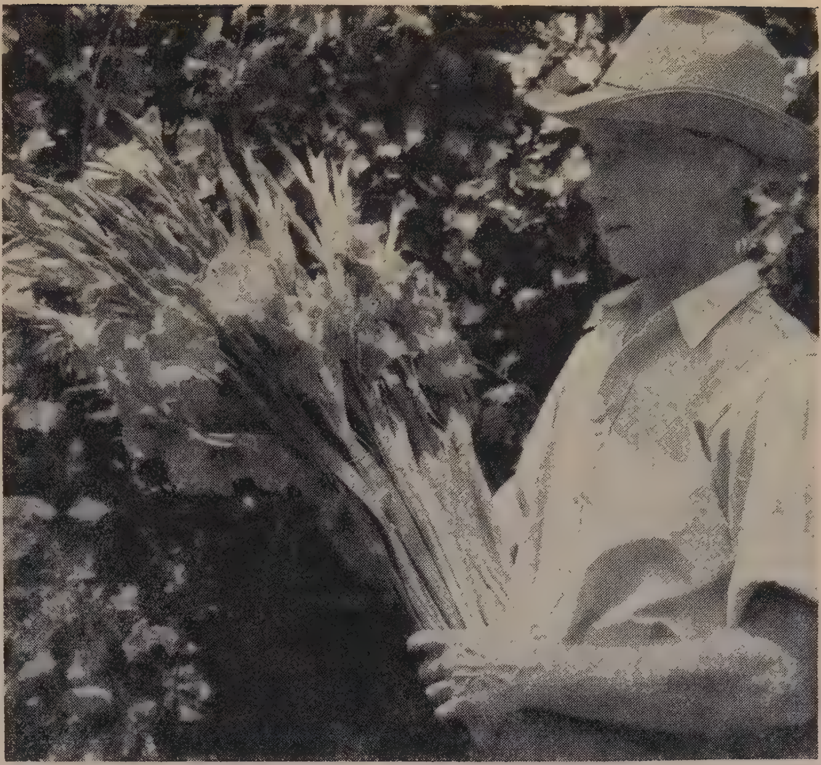
Adequate space is necessary for storing empty boxes and stacking packed ones. When empties arrive from the market they should be placed under cover immediately. Wet boxes are not only harmful to flowers, but are unpleasant to handle and unnecessarily heavy.

Packed boxes should be stacked neatly or placed by the door so that they can be loaded quickly and easily on to the transport going to market.

Where flowers are packed upright in boxes, even if protected by newspaper, sufficient space must be left between the boxes so that they can be lifted easily without the flowers intertwining. Handles or cleats on the ends of the boxes make this work easier.



A flower trolley is most useful on level ground for carrying flowers to the packing shed. The framework is removable so that the trolley can be used for other purposes.



The correct way to carry gladiolus bunches from the field, stems being supported on the forearm.

Bunching and Packing Benches

Flowers with single straight stems, such as narcissus, gladiolus, and poppies, can be bunched in the field; they should be graded at the time of picking. Plants with immature buds or excessive foliage, such as asters, dahlias, and cut shrubs, need attention before bunching. Depending on the quantity of flowers, they should either be placed in containers of water at a convenient working height or placed direct on the bench for bunching.

The bench should be designed to suit the person who is to use it. If indoors, it should be set against the wall with light from a window falling on it; it should be firm and wide enough to hold the flowers or boxes, but not so wide that the packer has to stretch to reach the back. The height above the floor is important; where a woman is working for any length of time a seat or stool should be available and the height fixed accordingly. For women standing a working height of 2 ft. 10 in. to 3 ft. allows boxes to be packed so that the packer can see right inside the box.

If a shed is inadequately heated and has a concrete floor, duckboards or some insulation from the floor should be provided, as otherwise workers will get cold feet and possibly chilblains. It has been proved conclusively in industry that efficient and comfortable working conditions make for efficient work and higher output.

The bench top is usually wood, but a working surface of linoleum, plastic, or American cloth is more pleasant to use and can be kept clean more easily. Wood becomes wet and may even produce splinters, and once the surface wears it can never be kept really clean. If the weather is not too hot and a large quantity of flowers is to be handled, it could be an advantage to have a bench which could be set up outside in the shade and worked from both sides.

Bunching and Packing

The buncher and packer will require rubber bands or tying material, wrapping paper, and a rubbish bin. Generally the use of rubber bands or raffia previously cut to convenient lengths is preferable to strips of flax or binder twine, except for woody material. The time saved and the general efficiency of rubber bands compensate for their cost. Rubber bands can be picked up direct from the boxes or slipped over a finger or hand. Adequate supplies should always be kept.

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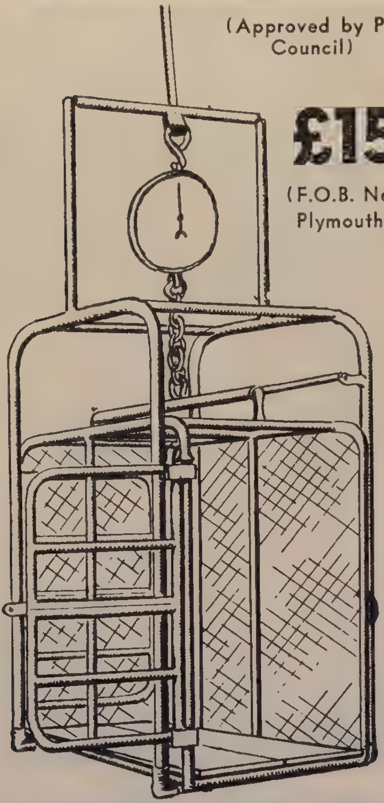

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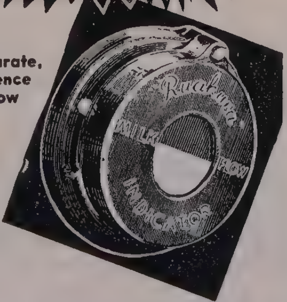

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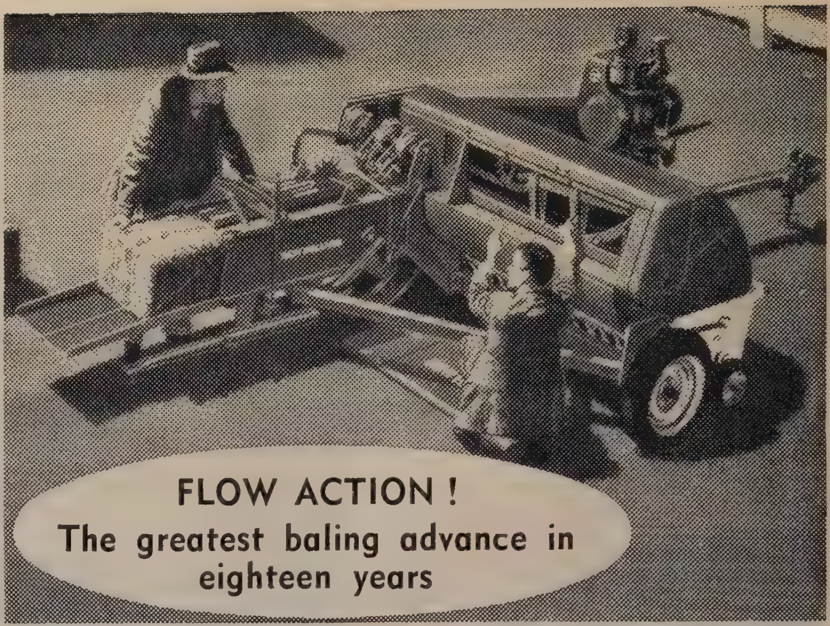

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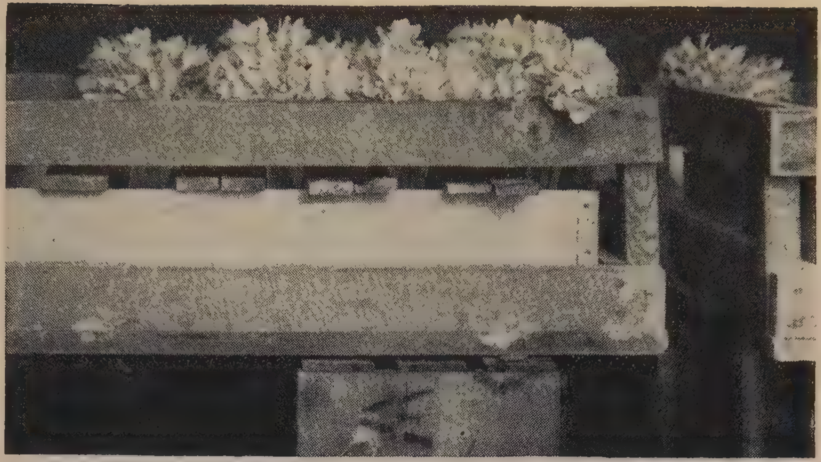


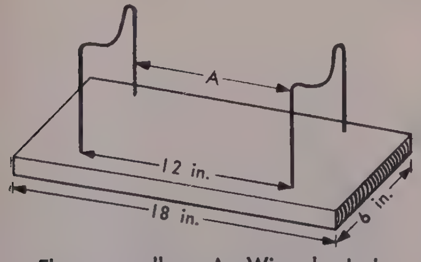
Water containers for cut flowers. Left—Field-bunched gladiolus set in clean 4-gallon tins to take up water before packing. Above—Golden Spur narcissus brought in from the field and placed in water before being graded and bunched. The long metal trough is divided by movable wooden slats.

Newspaper is commonly used for wrapping bunches or lining boxes. It is quite satisfactory for the general range of flowers, but it absorbs moisture and removes the smell from scented flowers. Florists' tissue is better for valuable or soft flowers, such as carnations or daphne.

The paper should be cut to a size suitable for bunching or lining. It can then be stacked on the bench or hung over a wire above the bench. The bunchers and packers should never have to cut and prepare their own packing material while packing is in progress.

Rubbish bins are essential for holding plant refuse and torn paper, so that benches can be kept clean and free from rubbish. Four-gallon open tins are excellent, but should be emptied daily once the packing is finished, as should the water containers.

Where flowers are bunched in the shed some growers lay them on a cradle (see diagram below). A cradle is also useful for supporting bunches of flowers off the bench when boxes are being packed.



Flower cradle. A—Wire bent to shape suitable for holding flowers for bunching.

Bunching and Packing Routine

Four different methods of bunching and packing can be followed:

1. Bunch in field, place flowers in water in shed, pack in box.
2. Unbunched flowers from field, place in water in shed, bunch, replace in water, pack.
3. Unbunched flowers from field, to bench for bunching, place in water, pack.
4. Unbunched flowers from field, place in water, bunch, and pack.

Method 1 is suitable for flowers which the picker can grade as he gathers. This is the most efficient method. Method 2 involves too much handling.

Methods 3 and 4 are similar and the choice of either depends on the type and quality of the flowers. Method 3 is preferable if quality is variable and more than two grades have to be made; it is also better where the flowers need a lot of attention before bunching, either for treatment of the stems or for removal of unwanted growths. Method 4 is applicable to flowers of an even grade which do not need much attention and is almost as efficient as method 1, as bunching and packing are continuous operations.

Treatment of Stems before Packing

Most flowers will take up water without any treatment. Those with hollow stems or which produce a milky sap need heat treatment; woody stems should be crushed to allow water to be taken up.

Heat treatment is given by singeing the bases of the stems in a flame or by placing the bases in very hot water 1 in. deep. Iceland poppies and dahlias need this treatment, though only to the bases of the stems.

The bases of the stems of woody plants like chrysanthemums, hydrangeas, and cut shrubs should be crushed on the bench with a hammer. Only the bases need treatment; sufficient firm wood should be left to fit on needlepoint holders of florists' containers.

Flowers and leaves should always be free of surplus moisture at packing time.

Sale of Cut Flowers

Cut flowers are sold through wholesale markets or direct to florists or the public. The choice of the best outlet depends on the proximity of the holding to a main market, whether or not the holding is on a frequently used road, the type and quantity of flowers grown, and the grower's own preference.

Requirements for Wholesale Markets

Wholesale markets require a regular large supply of each type of flower. Small consignments seldom make a good price unless the flowers are of exceptional quality, unusual, rare, or highly prized. Even then a regular supplier normally receives the highest prices. The main purchasers in the market are florists, who require large quantities of the flowers in season at the time of year and to a less extent

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Fruiterers will also buy quantities of seasonal flowers and will take flowers of lower quality than will florists, as they cater more for occasional purchasers. Representatives of hotels and some large firms will also buy from wholesale markets. They will require flowers and foliage which can be used for large displays. Few people get purely personal requirements at auction.

Regularity of supply and maintenance of good quality are most important; once a supplier to the markets is known by name for his produce competition for it will ensure good prices. His flowers will sell before odd lots from occasional suppliers. They may not be better than others offered at the same time, but the florist knows the type of material he can expect from regular suppliers and will purchase with confidence after valuing the first bunches put up for inspection.

Fruiterers, too, get to know suppliers and their produce, but to them this is less important than being able to purchase a quantity of one type of flower. They already know what price they are likely to charge and so will look for a quantity of an even grade, probably of lower quality than the florist requires.

Wholesale markets seldom require bunches of mixed flowers.

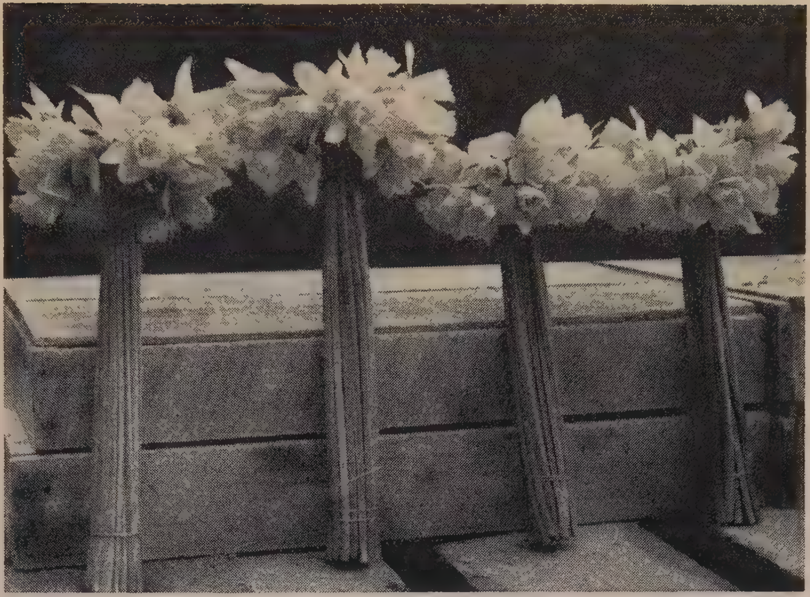
Florists Requirements

The main trade of florists is based on orders given in the shops for flowers to be supplied as gifts. Boxes or bunches of mixed choice flowers are regularly being sent to hospitals, ships, and private homes. Flowers are required for weddings, receptions, and funerals and though the flowers are made up into bouquets or sprays, the florist prefers to start with flowers on good stems and trim these rather than to make do with odds and ends.

The sale of single bunches of one type of flower is only a very small part of the retail trade and a florist's requirements will reach certain peaks, especially in winter, when an important function is to take place. Christmas and Easter, when white flowers especially are required, are two other busy times and more thought could be given to growing appropriate flowers for these occasions. There is also a peak demand on Mother's Day. If a grower had suitable storage, it might be worth storing flowers, even in winter, so that the market can be well supplied when important functions stimulate demand.

Florists are prepared to buy direct from growers small regular supplies of unusual flowers or flowers which do not keep well, such as roses. A grower with a large garden or a holding with a range of unusual shrubs and other flowers may be able to arrange to supply a florist with small quantities of them—quantities which might sell poorly on the open market. Prices paid would be a matter for mutual agreement and trust, but if a regular supply could be offered a fixed price could be agreed on for the whole of the season for one line of flowers. Generally this works in the grower's favour.

Even growers who produce large quantities of flowers make contracts for supplying florists with the whole of their output. Here again consistency of supply and quality is demanded, and the florists should be consulted before any major change in production is made.



Golden Spur narcissus are graded into two qualities, based mainly on length of stem. The two bunches at left are first quality and those at right second quality.

Direct Sales to Public

Where a grower's property abuts a frequently used road direct sales to passing motorists can be a good supplement to other outlets. No great quantity can be cleared in this way and it is certainly not profitable to have to stop work on the holding to sell 2s. worth of flowers and talk for 5 minutes. The sale should either be made by someone who is always near the road or a self-service box left near the flowers. Alternatively, arrangements could be made with a local full-time stall-holder to sell on commission.

Direct sales are one of the few ways in which mixed bunches can be sold, but even so people often prefer to buy a bunch of one type of flower rather than to have a ready-made selection. Delivery of flowers to a number of customers may seem desirable, but profit can be absorbed in the running of a van and the time spent away from the holding.

Supplying Distant Markets

Air transport now offers great possibilities for marketing flowers in all parts of New Zealand. However, before a grower starts consigning to a distant market he should make certain that his flowers are definitely required there.

Usually a distant market will be profitable only if the grower can:

1. Supply flowers, such as narcissus, earlier than local growers.
2. Supply a special line, such as carnations or gerberas, which are not grown to any great extent near the centre.
3. Supply high-quality flowers with a short season, such as tulips (even in the flush of the season).

Distant markets are no answer to local gluts and are unlikely to be profitable during the main harvesting period with flowers such as narcissus and gladiolus, which have a long marketing season.

So far little has been done to investigate the export of flowers. Some specialist growers are exploring the possibilities and an export trade with Australia and the U.S.A. may be developed.

Containers

Holdings close to market: The grower can deliver or arrange delivery in a covered van with the bunches of flowers set upright in boxes. Where carriers have mixed loads, flowers packed vertically may get damaged. If this is likely to occur, packing flat in boxes is preferable. Even when delivered direct to the market in this

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way flowers should be protected by wrapping paper round groups of bunches.

Boxes with the grower's mark should be well made, but not too large or heavy, as then boxes tend to be knocked and the flowers damaged as they are being unloaded and carried into auction rooms. Deliveries to florists can be made in the same way or the flowers laid flat on sheets of paper; the upright packing is better, as the flowers rub together less than when lying with one bunch on top of the other.

Holdings at a distance from market: Most growers at a distance from market forward flowers in large wooden boxes delivered and returned by carriers. Carriers' charges are based on the sizes of the boxes. Those used include banana cases, cut-down packing cases, or boxes made to order. These boxes are usually large, heavy, and very strongly made, but carriers, market staff, and florists dislike handling heavy and unwieldy packages. Growers favour these cases because they hold a large quantity of flowers and the flowers and the heavier cases are damaged less in transit. Carriers maintain that the variation in the sizes of boxes is more likely to cause damage, as the bulk of their loads consist of vegetables packed in standard cases. Any container which does not match the standard vegetable cases makes loading difficult and it or its contents are likely to be damaged. A consignment of standard boxes, even if they are different from vegetable cases, can be handled more efficiently than a collection of boxes varying in size.

The question of containers needs careful consideration; in most other parts of the world flowers are transported satisfactorily in much lighter containers than those used here. Anyone who has watched large cases being manhandled on and off the lorries at the markets will realise that these and the contents are subjected to more knocks than are lighter containers.

Growers who concentrate on certain lines would be well advised to make special containers for these flowers. There will be a standard delivery charge for full or empty containers, and growers who use standard containers for flowers like carnations, irises, gladiolus, and chrysanthemums have found that such containers benefit themselves and the purchaser. All boxes should be light enough when full to be handled by women and easily transported within the markets.

Wooden cases of the following sizes have proved popular among suppliers of the Wellington market:

7 in. deep, 14 in. wide, 28 in. long for carnations

6 in. deep, 18 in. wide, 30 in. long for irises, anemones, and narcissus

The timber used is ¼ or ⅜ in. undressed pine with the ends 1 in. thick.

Many growers nail lids to boxes, but lids are usually broken at the ends when the boxes are opened. A hinged lid is more satisfactory and provided two cleats are nailed across the inside and the lid is firmly tied down, it will not move during transit.

Cardboard Boxes

Cardboard boxes are excellent under certain circumstances for transport of flowers, such as when flowers are sent by air, as the charge for transport is usually based on the weight of the consignment. They can also be used for small flowers, such as bunches of daphne or orchids.

If chrysanthemums and other long-stemmed flowers are to be packed in cardboard boxes, it is advisable to staple thin wooden supports in the corners and at the sides of the boxes, as the weight of several boxes piled high may crush the lower boxes. By arrangement with the box manufacturers, it is possible to incorporate internal supports and yet make a box which is collapsible when empty and so returnable.

Cardboard boxes should be lined with non-absorbent paper, such as florists' tissue, as cardboard absorbs moisture from flowers. Packing should be done carefully so that the box is full and the bunches cannot shift; any spaces should be filled with crumpled newspaper.

Growers who consign flowers long distances by road do not favour cardboard boxes, as they tend to be crushed if ropes or tarpaulins are tied too tightly round the load. In this instance standardised wooden packages are preferable. On the other hand, cardboard boxes are excellent where deliveries are made by bus services.

Cool Storage of Flowers

Few growers or florists have cool stores for storing cut blooms, and the market is rather suspicious of cool-stored flowers, as occasionally they have had very poor lasting qualities. Cool stores are unlikely to be profitable if used only for holding flowers when the market is glutted. They are of greater value for holding flowers in expectation of a period of scarcity, to even out supplies, or in winter before a keen demand by florists on the eve of an important social function.

Cool stores must be properly constructed and should have high humidity with a minimum of air circulation. Stored flowers should be healthy and undamaged, as moulds can develop on damaged areas either in store or after dispatch.

Choice of Crops for Newcomers

It is difficult to advise newcomers to the cut flower industry as to the most profitable flowers to grow. If an easily grown flower makes a good price one season, supply is likely to be adequate the following season.

Some flowers are high priced because they are difficult to grow or require high capital outlay in glasshouses or equipment. Though flowers like orchids command high prices, there is only a limited demand, and a greater supply might bring prices down to unprofitable levels. Flowers such as narcissus, irises, and tulips are a sideline for many bulb growers. If grown only as cut flowers, they should either come on the market early or be of exceptional quality.

A study of the list of wholesale market requirements on pages 570 to 572 will indicate possible lines to grow. The final decision will depend on the grower's experience and the location of the holding, but almost any type of flower which will keep well in water will be profitable if high-quality blooms are consistently grown and are marketed in the best manner. White flowers occasionally make very high prices for special occasions, but seldom are much in demand.

If a large, old-established domestic garden is converted to commercial flower production, it may be better to sell direct to florists than to supply wholesale markets, but prices will depend on the quality of the flowers compared with those available at the markets. At certain periods, such as November and the end of February, when choice of flowers is limited, high prices will be paid for good blooms.

It is of little use aiming specifically to supply the market at Christmas, Easter, and for Anzac Day, or, in the south, during July, as the weather may upset the most carefully designed cropping. Growing flowers which can be harvested over a period, including these dates, is a wiser course.

Visits to Markets

Unless a grower is entirely satisfied with the financial return for his produce, he should periodically visit the market or his florist customers. He will then realise why his flowers make the return they do. He should compare his supplies carefully with others offered at the same time and discuss his problems with the auctioneer or florist.

These visits should be made at the peak of the supply season, not at the tail end of the crop. The grower may think he can ill-afford the time to visit the market in the busy season, but he will find it well worth while.

A morning at the market may save time in the future, help improve production and packing, and bring higher net returns. Poor prices may not be due to a poor market; they are more likely to occur if the flowers do not arrive and unpack up to the general standard.

Pot Plants

Pot plants are not supplied regularly to the wholesale markets, but florists want limited quantities. There is a steady demand for foliage plants, cacti, and cyclamen, though the last are often grown mainly as cut flowers, a surplus being sold as flowering plants.

Pot plant production is carried out mainly by glasshouse growers of seedlings or cut flowers.

Their production requires high capital investment, a knowledge of glasshouse culture of plants, and quick access to the florists. The same high standards are required as with cut flowers. There is an opening for further supplies, but the market possibilities should be fully studied before the growing of pot plants is undertaken.

Wholesale Market Requirements

For the following list of the requirements for Auckland, Wellington, and Christchurch wholesale markets comments were supplied by salesmen and the Horticulturists of the Horticulture Division in the three centres. Numbers of flowers per bunch are shown, but these flowers are often sold by the half gross or gross. Purchasers buy after a careful examination of the flowers displayed and usually base their price on the worst flowers in a bunch.

Cut Flower Requirements for Auckland, Wellington, and Christchurch Wholesale Markets

	Number in bunch	Market	
Ageratum	12	Ak., Ch.	Perennial. Fair demand when other flowers in short supply
Agapanthus	6	Wn.	Both flowers and dried seed heads wanted occasionally
Anemone	12	All	Good demand on all markets May to October. Flowers should be half open and have long stems. Cerise, red, and mauve most popular. Travel well
Arum	6	Ak.	Little demand for white, keen demand for small-flowered varieties (calla); large yellow also popular
	6	Wn.	Little demand for white; yellow and mauve calla sell well
	6	Ch.	Good demand throughout season. Smaller blooms preferred
			(Stems very soft; must be tied carefully. Travel well in bud stage)
Aster	12	All	Good demand, if well grown. Individual flowers on long stems required. Pink, red, and mauve popular. Do not travel well over long distances
Berries	6	Wn.	Fair demand for large branches of callicarpa, cotoneaster, eugenia, idesia. Holly unpopular owing to spines. Bunches of berries alone also required
Bilbergia	12	Ak.	Limited demand in August when other flowers short
Boronia	6 or 12	All	Keen demand for scented variety; other varieties less popular. Travel well
Bouvardia	6	Ak., Wn., Ch.	Keen demand for all colours. Heads often packed in boxes; need careful packing to prevent bruising
Calendula	12	Ak.	Not generally wanted; sometimes required in winter
	12	Wn.	Little demand
	12	Ch.	Good demand in winter after chrysanthemums finished. Travel well
Camellia	—	Ak.	Very limited demand
	—	Wn., Ch.	Fair demand. Should not be bunched as flowers bruise very easily; pack carefully in cardboard boxes or pin to sheet of cardboard
Carnation	12	Ak.	Good demand for quality lines. Clear pinks and reds most popular, variable demand for whites and poorer quality, striped and other colours not in demand
	12	Wn.	Keen demand for quality lines; glasshouse-grown varieties bring best prices. Pink most popular, but good self-colours and brighter striped varieties sell well. Social events affect market demand
	6 or 12	Ch.	Good demand for quality lines, especially glasshouse grown (bunched in sixes). Pink most popular; other self-colours sell well. Outside grown bunched in twelves. Popular in winter
			(Good-quality carnations should have non-splitting calyces, long strong stems, and be disbudded)
Chrysanthemum	6 to 12	All	Good demand for quality blooms of medium size. Heads should be disbudded and have good foliage on long, strong stems. Choice of variety is important. Flowers should have firm petals. Care in bunching is needed to prevent crushing of blooms. Colours are not important, provided quality is good. Travel well
Coreopsis	12	All	Seldom wanted
Cornflower	—	Ak.	Little demand
	12	Wn., Ch.	Steady demand, but seldom makes high prices. Blue most popular
Cyclamen	6 to 12	Ak.	Demand very variable; good-quality whites, pinks, and mauves required
	6	Wn.	Variable demand, depending on competition from other flowers. Bright colours required
	12	Ch.	Keen demand in winter; sell throughout year. All colours required
			(Need careful packing, as they bruise readily; pack in small quantities in strong cardboard boxes)
Daphne	3 to 6	Ak.	Keen demand for good quality
	3 to 6	Wn., Ch.	Demand variable. Bunch according to size of sprays. Most of the flowers should be open
Dahlia	12	Ak.	Very limited demand for charms and poms in light, clear shades
	12 or 36	Wn.	Steady demand for cactus and poms in clear colours, especially pinks and reds. Florists take medium decorative varieties on direct delivery
	6 or 12	Ch.	Very limited demand for smaller-flowered varieties in bright colours
			(Stems should be singed or plunged in hot water before dispatch; even then they do not travel well)
Daisy	12	Ak.	No demand for shastas. Marguerites sometimes wanted when other flowers scarce
	—	Wn.	Seldom supplied to market. Double whites used by florists for wreaths
	72 (6 x 12)	Ch.	Demand during winter only. Pink, yellow, and white double-flowered preferred. Travel well

CUT FLOWER REQUIREMENTS FOR WHOLESALE MARKETS

	Number in bunch	Market	
Delphinium	3 to 6	Ak.	Limited demand for small spikes and laterals
	3 to 6	Wn.	Good demand. Long stems though popular are difficult to market. Blue preferred, but increasing interest in pink and belladonna types
	3 to 6	Ch.	Good demand. Laterals and smaller stems find ready market. Deeper blues preferred. Supplied throughout season. Do not travel well
Dianthus	12 or 24	Wn., Ch.	Fair demand in season for border carnations and brightly coloured pinks; market can become oversupplied in mid season. Travel well
Echeveria	12	Ak.	Fair demand for *E. multicaule* in winter when other flowers short. Not required at other times
Erica	6	Ak.	Fair demand for wild red and white varieties early in season, when other flowers short
	6	Wn., Ch.	Adequate supply of wild varieties. Steady demand for cultivated varieties
Fern, asparagus		Ak.	Little demand
	6	Wn.	Long trails, 2 to 3 ft. long keenly sought; fair demand for shorter fans
	6	Ch.	Good demand throughout year, especially for trails
Fern, maidenhair		Ak.	Little demand
	12	Wn.	Steady demand throughout year. Keen demand for fine varieties in social season
	12	Ch.	Good demand throughout year, especially in social season
Flowering shrubs		Ak.	Fair demand for limited supplies of waratah, protea, and leucospermum. Others seldom offered
		Wn.	Good demand for wide range of shrubs such as banksia, cherry, forsythia, hakea, lilac, protea, and wintersweet. Market interested in unusual flowering shrubs
		Ch.	Material for decorative work keenly sought. Demand depends on supply of other flowers
Foliage shrubs		Ak.	Mainly manuka, in poppy season, but limited demand. Little demand at other times
		Wn.	Adequate supplies of beech (birch) in poppy season. Fair demand for fine- and variegated-leaved shrubs in winter to mix with Soleil d'Or narcissus
		Ch.	Fair demand in winter for fine-leaved material
Freesia	12	Ak.	Good demand for quality lines. *Burtoni* more popular than coloured varieties
	12	Wn.	Good demand, especially in June and July. Coloured and *Burtoni* varieties popular. Common freesia not recommended
	12	Ch.	Season begins April. Best prices for coloured varieties
			(Freesias should have as long a stem as possible. Travel well)
Gerbera	6 or 12	Ak.	Keen demand for newer varieties with bright, clean colours and long stems; doubles popular
	12	Wn.	Demand varies, depending on quantity and range of other flowers offered. Travel well
	12	Ch.	Keen demand. Small supply
Gladiolus	6	Ak.	Keen demand early and late in season for good-quality lines
	6	Wn.	Good demand for well grown spikes at beginning and end of season. They dominate the market from December to February and prices vary
	6	Ch.	Good demand for quality blooms right through season, beginning December
			(Should be bunched in separate colours, with not more than 2 or 3 florets open. Travel well)
Gypsophila		Ak.	Fair demand
	12	Wn.	Popular decorative flower. Blooms should be fully open. Both white and pink accepted
	12	Ch.	Keen demand, mainly available in summer. Open flowers and long stems required. Travel well
Helleborus	12	Ak., Wn.	Fair demand. Blooms must be clean, not damaged by weather
Humea elegans	12	Ak.	Good demand
Hyacinth	3 to 6	All	Keen demand for good quality. Stems must be long with plenty of bloom. Require careful packing
Iris	6	Ak.	Good demand for bulbous iris except white
	6	Wn., Ch.	Bulbous iris (all colours) sell steadily until September. *Iris innominata* coming on to market
			(Can be marketed quite tight in bud; should be cut with long stems. Travel well. Flag iris not required)
Ixia	12	All	Good demand for bright colours. Travel well
Kniphofia	6	Ak.	Usually good demand for all varieties
Lachenalia	6 or 12	All	Good demand for all varieties. Travel well
Lily	6	Ak.	Demand variable for white trumpets, fair for others
	6	Wn.	Peak demand for white varieties at Christmas; can be over-supplied. Fair demand throughout season for other varieties
	1, 3, 6	Ch.	Good demand, especially at Christmas. Packed according to size and demand
			(Anthers should be removed from stamens to prevent staining of petals with pollen)
Lily of the valley	12	All	Good demand. Blooms must be dry when packed or they brown. Travel well
Narcissus	12	Ak.	Season begins mid May with paper whites; steady demand for these, Soleil d'Or, and creams until poppies and daffodils come in. All daffodils wanted early in season; in flush, only good lines sought
	12	Wn.	Fair demand for paper whites and creams. Soleil d'Or sells well throughout season. Early daffodils such as Golden Spur popular, followed by King Alfred and Fortune. Good red cups in demand
	12	Ch.	Good demand for all types; Soleil d'Or dominates early market, followed by trumpet daffodils. Red cups popular

(Stiff-petalled blooms on good stems are required. Some varieties are difficult to pack in round bunches; consideration should be given to packing in faced bunches)

CUT FLOWER REQUIREMENTS FOR WHOLESALE MARKETS

	Number in bunch	Market	
Nerine	6 or 12	All	Popular in all markets
Orchid		Ak.	Fair demand. Older varieties of cymbidiums not wanted
		Wn.	Reasonable demand. Prices vary with social events. Market sensitive to over-supply
		Ch.	Keenly sought when available
Paeony	3 or 6	Wn.	Quite popular, sell well; reds are best
	3 or 6	Ch.	Good demand for newer shades. Travel well
Polyanthus		Ak.	Little demand except early in season
	12	Wn.	Yellow, red, and pink shades sell well from June onward. Travel well
	12	Ch.	Fair demand; clear colours preferred
Poppy (Iceland)	144 (12 x 12)	Ak.	Best demand early in season; drops off at flush of daffodil season except for top quality
	36	Wn.	Good demand from June to September; art shades and red most popular colours
	72 (6 x 12)	Ch.	Demand early in season (April) and when chrysanthemums are finished. Art shades preferred
			(Poppies should be cut when calyces just splitting; stems should be singed.
Primrose		Ak.	Little demand
	24	Wn.	Good prices received for attractive colours
	12	Ch.	Fair demand for all shades; doubles preferred
Pyrethrum	12	Ch.	Good demand when available
Ranunculus		Ak.	Seldom supplied
	12	Wn., Ch.	Large heads on long stems required. Do not travel well
Rose	6 to 12	Ak.	Demand very variable. Keen in winter
	6	Wn.	Choicest buds of selected varieties preferred. Do not travel well in hot weather
	6	Ch.	Variable demand; generally good, keen during winter. Etoile de Hollande and Mrs Herbert Stevens popular varieties. Specimen buds of double-hybrid polyantha sell well
Scabious	12	Ak.	Not in great demand
	12	Wn.	*S. caucasica* Blue Mountain and *S. columbaria* popular. Biennials not popular
	12	Ch.	Steady demand throughout year. Long stems preferred
Seed heads		Wn., Ch.	Fair demand for dried seed heads of Bells of Ireland, grasses, iris, and for ornamental gourds. A grower used to modern decorative arrangements will recognise suitable material. Bunch according to material
Sparaxis	12	All	Limited demand
Statice	12	Ak.	Good demand. Not supplied as dried flowers
	12	Wn.	Limited demand
	12	Ch.	Good demand during growing season. Flowers should be fully open and bunched separately in clear colours. Not supplied as dried flowers. Travel well
Stock	6 to 12	Ak.	Good demand in winter and spring for quality lines
	12	Wn.	Should be well grown with heavily flowered heads on longish stems. Mauve, purple, and pink preferred
	12	Ch.	Good demand in winter for quality blooms on long stems. Pink and mauve preferred. Supplied throughout year but often inferior lines marketed
Sweet pea		Ak.	Very limited demand
	12	Wn., Ch.	Keen demand in winter and spring; small demand in summer owing to short life of flowers. Long stems bunched in separate colours required
Sweet sultan	12	Ak.	Small supply meets good demand
		Wn., Ch.	Seldom offered
Tritonia	12	All	Limited demand
Tuberose		Ak., Wn.	Keenly sought
Tulip	12	Ak.	Good demand throughout season
	6	Wn.	High prices received early and late in season; adequate supply in mid season. Main supplies from bulb growers. Stripes and parrots not popular
	6	Ch.	Good demand during whole season
			(Should be marketed in the bud stage with as long stems as possible. Develop quickly in hot weather. Bunch in separate colours. Travel well)
Violet	25	Ak.	Long-stemmed, strong-scented varieties always in demand. Poorer varieties hard to sell in flush of season
	36	Wn.	Long-stemmed scented varieties required, especially from May to August. Supply decreasing
	144 (6 x 24)	Ch.	Good demand from April onward. Supplies sometimes exceed demand late in season
			(Violets are one of the few flowers marketed with a few leaves round bunches)
Water lilies	6	Ak.	Fair demand except in flush of season. Pinks and blues popular
	6	Ch.	Fair demand when available
Watsonia	6	Ak.	Fair demand for modern hybrids
	6	Ch.	Demand appears to be increasing
Zinnia	12	Ak.	Little demand
	12	Wn.	Good prices paid for best quality; separate colours or matching colours preferred. Pompone type meets with good demand
	6 or 12	Ch.	Keen demand for quality blooms; second grade usually bunched in twelves. Difficult flower to market owing to hollow neck
Pot plants		Ak.	Limited demand for cyclamen; little for others
		Wn.	Limited demand for cyclamen. Increasing interest in all types of house plants
		Ch.	Limited demand for tuberous begonias; good demand for well grown cyclamen; supplies of coleus have exceeded demand for some years. Foliage plants have become extremely popular and sell well

Further Ruakura Studies Show

STRIP GRAZING WILL AFFECT PRODUCTION

and Has Other Advantages, but

STOCKING RATE HAS A FAR GREATER INFLUENCE

THAT stocking rate has a far greater influence on production per acre than does grazing management was confirmed by a fourth experiment at Ruakura Animal Research Station comparing strip grazing and rotational paddock grazing of dairy cows. Three previous Ruakura experiments that showed no superiority of the strip-grazing method during the main period of grass growth did not accord with some overseas results, but at Ruakura stocking rates in the first experiments were the same in the two systems, whereas in the overseas trials strip-grazed rates were higher. That there is a difference in production under the two methods and that strip grazing does offer the possibility of some extra advantages are conclusions drawn in the following article on the fourth Ruakura trial, which is adapted from a paper presented to the 10th Ruakura Farmers' Conference by I. A. M. Lucas, of the Rowett Research Institute, Scotland. He was attached to Ruakura for a year under a National Research Fellowship.

AT the Ruakura Farmers' Conference of 1956 Dr C. P. McMeekan summed up the three previous experiments on strip grazing at Ruakura Animal Research Station. He concluded that these experiments failed to demonstrate any superiority of the strip over the rotational paddock-grazing system as a method of feeding dairy cows **during the main period of pasture growth**. This was not in accordance with results obtained in some overseas trials. For example, in an experiment carried out in Scotland the production per acre was higher by 20 to 40 per cent with strip grazing than with rotational paddock grazing.

The most important difference between the plans of these experiments was that at Ruakura the overall stocking rates had been the same on both systems of management, whereas in Scotland the overall stocking rate on the strip-grazed area was 30 per cent higher than on the paddock-grazed area. This prompted Dr McMeekan and Dr J. J. Hancock to point out in 1954 that New Zealand trials have illustrated the powerful effect which stocking rate has on production per acre, and that this factor and not grazing management might have been the major cause of the difference in production found in Scotland. The fourth experiment on strip grazing at Ruakura, details of which follow, was planned to test whether this explanation is true.

Nine fields at No. 5 dairy were each split into 3 paddocks with the ratios 4 : 3 : 3. This gave 3 sets of 9 paddocks which were similar in soil and pasture types, one set totalling 12.2 acres and the other two sets each totalling 9.2 acres.

TABLE 1—PLAN OF EXPERIMENT

	Comparison of		
	A	B	C
No. of paddocks	9	9	9
Cows per acre ..	1.1	1.5	1.5
Grazing method ..	Paddock	Strip	Paddock

The cows used were identical twin grade Jerseys which had been in milk for about 2 months. They were split into three groups each of 14 animals. Group A was paddock grazed on the largest set of paddocks, giving an overall stocking rate of 1.1 cows per acre; group B was strip grazed on the second set of paddocks; and group C was paddock grazed on the third set. For groups B and C, with smaller total areas, the stocking rates were 32 per cent higher at 1.5 cows per acre.

The comparison of paddock grazing at the lower stocking rate with strip grazing at the higher stocking rate was similar to the plan of the Scottish trial, and higher productivity per acre would be expected from the second system. However, if this extra productivity was due to stocking rate and not to the change in grazing management, it would also occur in group C cows, which were stocked at the higher rate but not strip grazed.

It was decided that in this experiment the three groups of cows should be managed independently of each other, but that certain principles should be followed. The most important of these were that all cows should be fully fed, that groups A and C should be moved to fresh paddocks each day, and that group B cows should be given a fresh strip twice daily after milking. The sizes of these strips were adjusted so that they were small enough to force the cows to eat the grass down to a height of 2 to 3 in., yet large enough to allow the cows to satisfy their appetites. Whenever surpluses of grass accumulated within a set of paddocks, one or more of the paddocks was dropped from the grazing rotation and cut for silage or hay.

The experiment started on 4 October 1957. The weather was cool and the spring flush of grass was not as marked as is usual at Ruakura. However, the growth was well maintained and did not decline until early January. By 16 January it was thought that neither the strip- nor paddock-grazed cows at the higher rate of stocking could continue to be fully fed; therefore the experiment was concluded on that date.

Results

Table 2 shows that despite the intention to full-feed all cows, the strip-grazed animals each ate an average of about 200 lb. less dry matter over

TABLE 2—PRODUCTION PER COW IN 15 WEEKS

	A (Low stocked, paddock grazed)	B (High stocked, strip grazed)	C (High stocked, paddock grazed)
Herbage dry matter eaten	3,450 lb.	3,260 lb.	3,430 lb.
Milk produced ..	269 gals.	263 gals.	261 gals.
Butterfat produced ..	140 lb.	144 lb.	136 lb.

the 15 weeks of the experiment than those which were paddock grazed. One explanation of this could have been a too severe restriction in size of the strips coupled with a reduced opportunity for selective grazing, but there are other possibilities. For example, the small areas of the strips could have restricted the amount of walking which the cows did, and so lowered their requirements for feed energy. This in turn could reduce their appetites.

Whatever the true explanation, it was clear that the strip-grazed cows made better use of their feed than the other two groups, for despite their slightly restricted intakes, their yields of milk and butterfat did not suffer. Table 1 shows that in this experiment neither stocking rate nor grazing method had any consistent effect on milk or butterfat yield per cow; nor did they have any consistent effect on liveweight gain.

Table 3 shows that the greatest differences in production per acre were due to the 32 per cent higher rate of stocking in groups B and C. This caused increases of about 90 gallons of milk, 50 lb. of butterfat, and 900 lb. of herbage dry matter per acre over the experimental period. In comparison with these large effects, the production differences between the strip- and paddock-grazed groups at the high stocking rate were small. Because they varied considerably from cow to cow they were also without any significance.

Thus we may conclude that most of the advantage of strip grazing in the overseas trials has been due to the difference in stocking rate and not to grazing management. However, if the details of herbage production per acre in the fourth Ruakura experiment are studied in more detail, it is evident that the results do not support the statement that there is **no** difference between the effects of strip and paddock grazing.

In this experiment the amounts of herbage eaten by the cows were determined with a technique which has been developed at Ruakura and the amounts cut for silage and hay were weighed directly. The extra herbage cover on the paddocks at the end of the experimental period was estimated by subtracting the herbage cover at the beginning of the experiment from the herbage cover at the end. These were determined by mowing and weighing sample strips in each paddock.

Thus it was possible to compile a herbage balance sheet for each set of paddocks (Table 4). The most notable feature of the balances is that, though no herbage was cut for silage on the high-stocked paddock-grazed area, an average of 470 lb. of dry matter per acre was taken from the strip-grazed area. This was achieved by cutting two paddocks—almost one quarter of the area—on 15 November.

TABLE 4—DETAILS OF HERBAGE PRODUCTION PER ACRE
(Lb. dry matter)

	A (Low stocked, paddock grazed)	B (High stocked, strip grazed)	C (High stocked) paddock grazed)
Eaten by cows	3,360	4,970	5,220
Cut for silage and hay	490	470	0
Extra cover on paddocks ..	1,080	430	540
Total	4,930	5,870	5,760

This difference between the effects of strip and paddock grazing was clearly of considerable practical importance, but it is interesting that almost one half of the dry matter cut was accounted for by the small percentage reduction in the large amount of dry matter eaten by the cows. Another quarter was accounted for by the slightly smaller herbage cover on the strip-grazed area at the end of the experiment, and the fourth quarter was due to the very small increase in total herbage production on this area.

Though they had the important overall effect of allowing silage to be made, these separate effects were in themselves small and it is unlikely that they would **always** occur with strip grazing and that more silage could **always** be produced. However, as strip grazing would be expected to reduce intake by forcing the cows to eat the unpalatable as well as the palatable grasses, and perhaps also by reducing feed requirements and appetite, it seems that the main condition giving rise to small feed surpluses would occur more frequently with this grazing method than with rotational paddock grazing.

When a small surplus of feed does accumulate there is little doubt that it is more easily seen to be a surplus when strip grazing is being used than when each paddock is grazed very much more laxly about once every 8 days. After its existence has been appreciated the surplus can be cut for conservation.

One complication in drawing practical conclusions from experiments on grazing management is the lack of exact definition for the terms used. For example, with rotational "paddock grazing" in this experiment the stock were grazed at concentrations of 10 to 14 cows per acre and moved to a fresh paddock each day. With "strip grazing" the average concentration was 106 cows per acre, with twice-daily shifts.

In recommendations which are frequently given, however, rotational "paddock grazing" implies stock concentrations of 30 or sometimes even 60 cows per acre, with a daily shift of paddocks. It is clear that this is not the same as "paddock grazing" in our experiment, though both are given the same name. In effect, "paddock grazing" which involves subdivision of the farm into paddocks of 1 to 2 acres for a 60-cow herd lies about half way between the systems of "paddock" and "strip" grazing which we compared. Therefore this degree of subdivision should help in achieving any advantages which strip grazing may offer.

We confirmed that stocking rate exerts a far greater influence on production per acre than does grazing management, but that, in comparison with rotational paddock grazing at somewhat low stock concentrations, strip grazing offers at least the possibility of some extra advantages. These are slight restrictions in feed intake, which should not affect milk and fat yields, and a greater ease in appreciating when a small surplus of grass accumulates and is available for conservation.

Finally, it must be stressed again that our experiment and these comments apply only to pasture utilisation during the spring period of maximum grass growth. At other times of the year strip grazing may assume a different and greater relative importance as a method of rationing limited feed supplies.

TABLE 3—PRODUCTION PER ACRE IN 15 WEEKS

	A (Low stocked, paddock grazed)	B (High stocked, strip grazed)	C (High stocked, paddock grazed)
Milk	308 gals.	400 gals.	398 gals.
Butterfat	160 lb.	219 lb.	207 lb.
Herbage dry matter ..	4,930 lb.	5,870 lb.	5,760 lb.

The Home Garden in January

By A. G. KENNELLY,
Horticultural Instructor,
Department of Agriculture,
Dunedin

WEED control, attention to vegetables for winter supply, and sowing of successional crops to mature in autumn are usually first-priority jobs in the home garden in January. Growth in most gardens is still vigorous and holidaymakers returning home late in January are often amazed at the development of plants and weeds.

SOWING, PLANTING, AND OTHER WORK

Successional Sowings

Dwarf beans, beetroot, carrots, lettuce, peas, radishes, spring onions, turnips.

Other Sowings if Not Yet Done

Parsnips (now late for sowing, except in districts having a long, mild autumn), swede turnip.

Plants to Set out

Early and late maturing varieties of Savoy or winter cabbage, winter cauliflower or broccoli (several varieties each of a different maturity period to ensure succession), borecole or kale, brussels sprouts, leeks, round or summer cabbage, cauliflower varieties maturing in 3, 4, or 5 months for succession.

Routine Work

Sow a cover crop on any ground not to be used for cropping for some time.

Lift kumara runners to prevent them rooting.

Remove side shoots and give support to tall and intermediate varieties of tomatoes.

Keep the hoe sharp and hoe out weeds when they are small. Hoeing is most effective in warm, dry weather.

Build a tidy compost heap with unwanted vegetable refuse. Burn only woody material or material affected with readily spread pests and diseases.

Keep potatoes earthed up to prevent greening of the tubers and to protect the tubers against infestation with potato tuber moth.

Spraying

Spray tomatoes and vegetables infested with caterpillars, vegetable weevils, green vegetable bugs, and other active pests with DDT or with lindane and DDT mixed if aphids (grey aphids, green fly, or black fly) are also present.

Spray potatoes and tomatoes with copper sprays (bordeaux or copper oxychloride) or certified substitute where conditions tend to be warm and humid and potato blight is present or likely to be troublesome.

Spray beans and other crops infested with red spider mite with summer oil and nicotine sulphate or with a certified miticide (the mites are tiny, greenish, yellowish, or reddish) and feed on the undersides of the leaves, denuding them of their green colouring matter.

Spray onions and other crops infested with thrips with DDT or lindane.

Spray celery where necessary against leaf diseases with captan or zineb or copper sprays.

Under Glass

Where necessary spray tomatoes affected with leaf mould fungus at 10-day intervals with salicylanilide or zineb. Thiram is particularly effective against the common form of stem rot (*Botrytis*). Heavy applications of captan usually give protection against the less common form of stem rot.

Beans

WHERE earlier sown crops of beans are now falling off in yield, dwarf or french beans can now be sown for late-autumn use. In most southern districts it is advisable to sow in the earlier part of January; the measure of success obtained usually depends largely on favourable autumn weather. In more favourable districts February sowings of quick-maturing varieties usually do well.

Grown under good conditions, dwarf beans come into bearing in about 8 to 10 weeks. Late January sowing in most districts should be in warm, sheltered situations, because even relatively light frosts stop the development of beans. Though beans grow in a fairly wide range of soils, they need a constant moisture supply.

The soil should be well worked before sowing. A friable well drained loam reasonably supplied with organic matter suits the crop well. Beans are not usually regarded as gross feeders and generally on reasonably fertile soils only moderate fertiliser applications are needed. On many of the richer soils that are well supplied with nitrogen a dressing of superphosphate alone, at about 2 oz. per square yard, gives satisfactory results, though on poorer soils a complete fertiliser is usually advisable. As beans are not deep rooted, water should be given if conditions are dry, as otherwise the plants may be slow in development.

Seed is best sown about 1 to 2 in. deep according to whether the soil is heavy or light in the bottom of a trench taken out with a hoe about 2in. deep. January sowings in dry weather should preferably be made a little deeper than early sowings. Rows should be 24 in. to 30 in. apart. Good varieties include The Prince and Tendergreen.

Diseases

The principal diseases of beans in New Zealand are anthracnose, bean mosaic, and halo blight. The last shows as small, greasy, water-soaked spots ⅛ to ½ in. in diameter on leaves, stems, and pods. It causes dwarfing or death of young plants or unsightly lesions that may make pods unusable. Halo blight is seed borne and in most conditions infection is rapidly spread by rain splashes or insects.

Anthracnose is a fungous disease which forms dark brown, sunken lesions on pods and stems and a black discolouration of midribs and veins of the leaves. Anthracnose is also seed carried and though in New Zealand it does not normally cause as much damage as halo blight, it occasionally makes a crop unfit for harvesting.

Bean mosaic is quite distinct and a severe infection is characterised by a dark mottling and distortion of the young leaves. Stunting of plants is common among susceptible varieties and pods may be small, reduced in number, or fail to develop. Many crops have a small number of infected plants, but only rarely is the amount sufficient to bring about serious crop loss. This disease is also seed carried and can be transmitted from diseased to healthy plants by rubbing and by insect pests.

Methods of control of bean diseases include use of disease-free seed, sprays, seed dusts (copper oxychloride and

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thiram have given fairly good results). and the use of resistant varieties. Generally the white-seeded pole beans are moderately resistant to halo blight.

Lettuces

In January lettuces are usually best sown where the crop is to mature. Though lettuces, like such plants as cabbages, beets, and tomatoes, transplant readily, their ability to withstand transplanting varies with conditions. When conditions are good damaged and destroyed roots are normally replaced quickly by new growth. In January, when conditions are often dry, transplanting, even if the work is done with the greatest care, is likely to cause a severe check.

During the warmer part of the year lettuces are grown in practically all home gardens and with successional sowing or planting they can be grown in most districts to be available throughout the year. Plants must be grown quickly if the leaves are to be crisp. Slow growth or checks to growth cause the flavour to be bitter, and though varieties of lettuce have been developed that have considerable tolerance to hot weather, high-quality lettuce can be produced consistently only where the temperature of the soil and the air is moderately cool while the crop is maturing. Fluctuating high and low temperatures do not permit good growth. With most varieties high temperatures tend to give early seed head development, bitter flavour, and poor hearts.

Lettuces mature in from about 2 to 5 months according to growing conditions and varieties, but conditions have to be exceptionally favourable to produce good lettuces in 2 months. Sowings made to give plants that will mature late in the season should not be large, because though lettuces will tolerate fairly heavy frost, plants severely frosted at or near maturity will have their outer leaves damaged and the plants may be subject to slimy rot.

Manuring

The root systems of lettuce are relatively shallow and though excess water is not desirable, plants should be set out in a moist soil that does not dry out. Practically all soils are improved for lettuce growing by the addition of organic matter. The amount needed varies with the soil type. Loss of organic matter owing to decomposition is rapid in light soils, but heavy soils also need organic matter, as it improves aeration and water movement.

Well rotted farmyard manure gives excellent results, but very heavy dressings, particularly when the weather is most favourable for growth, may result in loose heads. Where sufficient farmyard manure, compost, or similar material cannot be obtained, soil can be improved by growing a green manure crop and digging it in early enough for it to rot down before the lettuce is set out.

Bean pods should be picked before full maturity to ensure that the plants continue in vigorous bearing.

Unless rotting is fairly complete before the plants are set out growth may be checked through depletion of the nitrogen in the soil by the bacteria that cause decomposition. On very heavy soils, where the danger of depletion of the nitrogen supply may be outweighed by the advantage of improving the physical condition of the soil, it may be advisable to allow the green crop to mature fully before digging it in. A mature crop contains more fibre than an immature crop and when incorporated in the soil is likely to have a more lasting effect.

If additional fertiliser is needed, blood and bone is likely to give good results on most soils. Alternatively, a so-called complete fertiliser can be made by mixing 2½ parts of sulphate of ammonia, 2½ parts of superphosphate, and 1 part of sulphate of potash. The complete fertiliser is much more concentrated than blood and bone and it can be applied at about half the rate.

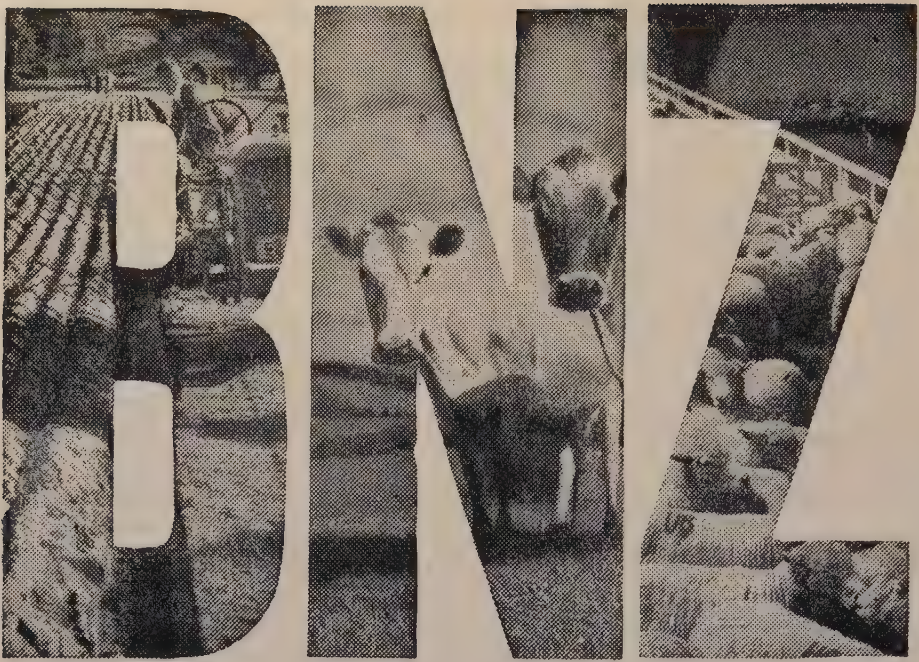
Application can vary from about 2 to 6 oz. to the square yard according to the fertiliser and the fertility of the soil. In home gardens a manure which is rich in nitrogen is usually needed most for lettuces. However, too much nitrogen may result in poor hearts and loose leaves.

Soil should be worked to a fine tilth for sowing, as lettuce seed is small and germination is relatively weak. Seeds should be sown thinly (as the first thinning should leave plants about 6 in. apart) about ¼ in. deep in rows 12 to 15 in. apart.

Popular varieties for sowing in January include Great Lakes, Webbs Wonderful, Imperial 847, Pennlake, and Summer Gem.

Onions

Weed control is particularly important where onions have not yet reached maturity. Weeds not only use up available plant food but when conditions are damp tend to create an environment unfavourable to the ripening of the bulbs. Though many onion crops are ready for harvesting in January, those that were planted late or are still growing well should be kept free of weeds and pests and diseases to induce them to grow to maximum size.



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Peas

In all except the mildest districts January is the latest month for sowing peas which will mature before winter. In the cooler districts a quick-maturing variety should be chosen and in most southern districts it is advisable to sow early in the month. Peas thrive in cool but not cold conditions, and a moist, deeply cultivated, well drained soil containing adequate humus is best.

Soil preparation should be thorough. The ground should be deeply dug and where necessary organic material such as compost or farmyard manure should be incorporated, preferably some time before sowing, though peas usually do best following a crop that was well manured with organic and inorganic manure.

The addition of superphosphate at 1 to 2 oz. per square yard has proved beneficial on many of the heavier soils that have been kept in good condition by adequate manuring with organic material or by the digging in of green crops, but on the lighter soils a complete fertiliser is likely to give better results. Only moderate fertiliser applications are advised on soils in reasonably good condition. Too heavy manuring, particularly with nitrogenous organic manures, tends to promote excessive vegetative or straw growth and makes the crop more liable to disease.

Lime is essential on most soils and can be supplied by an annual dressing of 3 to 4 oz. of carbonate of lime per square yard.

Sowing

Seed should be sown in V-shaped or broad, flat drills usually drawn out with the hoe. Drills should be 2 to 3 in. deep, except where conditions are hot and dry, when they should be considerably deeper so that, though the seed should not be covered with more than 2 in. of soil, the roots will be well down in the cooler and moister lower soil levels. This is very important when conditions are dry or where heavy wind is likely, as the plants can to some extent be gradually earthed up the stems as they develop. Dwarf varieties should require no other support.

Protection of newly emerged peas against birds is essential in some districts, though birds are mainly troublesome in early spring, when food is scarce and is lacking in variety. Pea guards made of wire netting are most effective, provided the ends are blocked, but they should be removed before the peas become entangled in the wire. Cotton stretched over the shoots is effective if a number of strands, which may be criss-crossed or stretched in parallel lines, are used.

[Green and Hahn

The planting out of winter greens is one of the most important jobs at this time of year.

[Green and Hahn

Growth is usually vigorous in January and constant attention is necessary to control weeds.

Varieties

Most seed catalogues give a list of varieties with heights and the approximate number of days each variety requires to mature. Popular varieties include the quicker-maturing varieties Little Marvel and William Massey and the intermediate varieties Victory Freezer and Greenfeast.

Shallots

The food value of the shallot is considered to be not less than that of the onion, and considering the simplicity of its culture it is rather surprising that it is not more commonly grown in New Zealand. Most crops have attained optimum development by January and water should then be withheld and the bulbs permitted to dry off.

If shallots are carefully harvested when properly dry and then stored in a cool place, they should keep until

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the following spring. Proper drying and sorting over of the bulbs before storage are important. Bulbs that have been fed with excessive quantities of nitrogenous manures are difficult to harden off and should be used as soon as possible; damaged bulbs should be used at once or destroyed.

Sweet Corn

Sweet corn bears separate male and female flowers, the tassel being the male inflorescence and the ear the female. Pollination normally takes place as soon as the silks appear and development of the cob should be rapid thereafter; the edible stage is usually reached 2 to 4 weeks later according to temperature, usually when the tassel has just withered. Maturity is commonly tested by thumbnail pressure. The young grains are first watery inside, then milky, then doughy, and finally the "dent" stage is reached, when the grains are too hard to be palatable.

Cobs should be harvested with a gentle jerk or cut with a sharp knife when the milky part of the grain is beginning to thicken but is still milky. In very exposed situations it is advisable to stake sweet corn, but in most situations earthing up of the stems will provide all the support necessary. Suckers often develop, but there is no evidence that their removal promotes earliness or increases the number or weight of the ears on the stem.

Swedes and Turnips

In districts where conditions are not too dry and a reasonably long growing season is assured seed of swede turnips can still be sown. Swedes are high yielding and usually considered to have more food value than ordinary turnips and are especially useful during winter.

To be of good quality turnips should be grown quickly. Soil for them should be well drained, but moist and rich in humus and cultivated to a fine tilth. The crop can be grown on most garden soils, but a light loam is preferable.

Superphosphate is often the only fertiliser used for farm swede or turnip crops, but a complete fertiliser is likely to be most satisfactory on many of the less fertile, well worked home garden soils.

In most southern districts or in areas where adequate soil moisture can be maintained January is a good time to sow turnips. Elsewhere sowing is often delayed until cooler or more moist conditions are assured. Seed should be sown thinly ½ in. deep in rows 12 in. apart and plants later thinned to 3 to 4 in. apart.

Good varieties include Purple Top, White Milan, Purple Prince, and Golden Ball. Golden Ball is often chosen for December to March sowing, because yellow-fleshed varieties usually stand longer under adverse conditions than do the white ones. Superlative is one of the most popular varieties of swedes for the home garden.

Spraying and Dusting Equipment for the Home Garden

Though pests and diseases are liable to be troublesome throughout the year, it is from late spring until late autumn, that is, during the main growing season, that most pests and many diseases are especially troublesome.

The provision of efficient and economical spraying or dusting equipment is, therefore, very important to the home gardener. Though many of the modern materials used in the control of insect pests and diseases are highly efficient, they can be quite costly if used in considerable amounts, so it is most important, both from the point of view of effective control of pests and diseases and for economical use of sprays or dusts to have efficient equipment. Some of the principal types of home garden equipment are as follows:

A handy type of sprayer for a small garden.

Hand Syringes

Hand syringes were evolved mainly to meet the needs of gardeners engaged in glasshouse or propagating work; they are suited only to the spraying of individual plants or small groups of plants. Some of the types produce coarse droplets and so are relatively wasteful of spray. Because one stroke usually empties them, extensive spraying with them is laborious.

Hand Sprayer (Atomiser)

The hand sprayer is suited only to small gardens and its use is confined to spray materials having small particle size. It has attached a small container for the spray liquid. The action of the best types is usually continuous and within the limitations set by its size and output the sprayer is very effective.

The ordinary fly sprayer, though much lighter in construction and simpler in design, is an example of the type.

Hand Powder Duster

The powder duster is handy and effective for the home garden. It is especially useful where the moisture in a spray may be conducive to the development of the disease being controlled. It has quite a wide range of application and in appearance is usually somewhat like the hand sprayer, with a container and pressure unit or bellows similarly attached from which dust is automatically withdrawn and directed continuously, in the most effective models, at the object being dusted.

Double-acting Hand Sprayer

The double-acting hand sprayer is actually a continuous-acting syringe and is a useful sprayer for the home garden. It consists of a simple double-acting pump which delivers a continuous spray sucked through a length of flexible hose the end of which is kept in the spray container. A long hose gives greater flexibility to the operator, but makes pumping harder.

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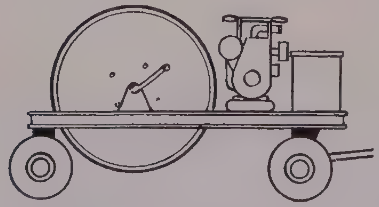

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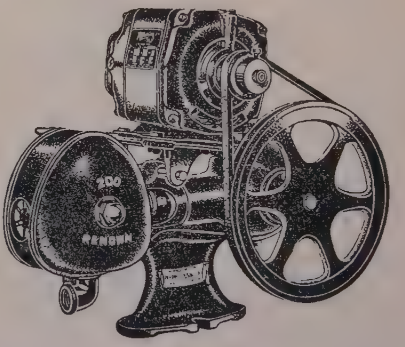

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bulbous pressure chamber which ensures that once pressure has been built up it can be maintained continuously with only a moderate pressure on the pump handle. Good light and heavy types are available, but for the most efficient results it is usually preferable to have one person pumping and another directing the spray. For this a good length of flexible hose is desirable, though the longer the hose is the harder it is to maintain pressure.

Knapsack Sprayers

Knapsack sprayers are carried on the back and operated by pumping with one hand while the other directs the spray. Unless the garden is a large one, they are usually considered too costly for home gardens. Double-acting knapsack sprayers, particularly if they have high-pressure chambers, are more effective than the ordinary types.

Pressure Sprayers

Several types of pressure sprayers are now available, either for hand use or for carrying on the back. Pressure is built up first with a pump which is usually, but not always, incorporated in the sprayer. In some sprayers pressures as high as 80 lb. or more per square inch can be reached. The spray mixture is released as needed by pressing a knob or lever and, because of the high pressures that can be built up, a good degree of atomisation is attained, resulting in economy in use of spray material and an effective, mist-like coverage. Some of the small hand models can be used effectively on the end of a pole for spraying high foliage.

Sprayer driven by a vacuum cleaner.

Disease Control

SPRAYING is not the only way to control pests and diseases. Diseases particularly are often likely to be reduced in incidence and severity by good husbandry, that is, by the care of the soil, by ensuring that drainage, moisture, and aeration are satisfactory, and by the provision of plant foods in balanced quantities and the addition of organic matter to improve soil structure and plant food supply.

The provision of shelter, the best siting of the garden, the choice of varieties suited to the district (and where practicable the use of disease-resistant varieties) are all of great importance in the control of pests and diseases.

It has been suggested, particularly by some who do not favour the use of mineral fertilisers, that the use of poisonous material for the control of pests and diseases is an admission of failure to be aligned with nature. However, production of vegetables in the home garden cannot follow strictly the way of nature.

Most of the cultivated vegetables are unnatural in the sense that they are unrecognisable or almost unrecognisable, due to hybridisation and selection, from their progenitors living in their natural habitat, and to be maintained at their best they require the artificial conditions of the well kept garden.

Vacuum Cleaners

Most vacuum cleaners have an attachment for spraying which consists of a screw-top jar to which can be fitted a moulded plastic top with a jet or nozzle and suction pipe and point for attachment to the air hose of the cleaner. The jet or nozzle on the more modern vacuum cleaners is usually readily adjustable by turning a threaded knob; alternatively, the sprayer is usually designed so that it is possible to fit one of a series of nozzles or jets, each with an aperture of a different size. For spraying, the air hose on the commonest types of vacuum cleaner must be fitted to the special aperature on the rear end of the machine. The spray is drawn out of the jet from the jar and atomised by the powerful current of air which emerges from the aperatures around the jet.

Atomisation of the spray is usually quite good and usually the droplet size can be varied to suit various concentrations of spray for the subjects sprayed. Economy of spray material is usually an important feature. The chief disadvantage, and one which is shared with several other types of sprayer, is the restriction on spraying angles imposed by the design. This can be overcome to some extent if it is possible to walk round the object being sprayed.

Sprayers equipped with an extension nozzle which can be set at an angle are more versatile in use than vacuum cleaner sprayers, as they enable spraying to be done from different angles, upward or downward or under leaves, and more readily within the framework of a branched plant.

Good electrical connections and a good-quality rubber-covered extension cord long enough to reach the plants to be sprayed are essential where a vacuum cleaner is to be used for spraying in the garden.

Spray Coverage

The importance of using adequate pressure and the correct type of nozzle can hardly be over-emphasised. Adequate pressure to drive, and preferably atomise, the spray liquid gives coverage without waste.

Spray Nozzles

For most horticultural purposes spray nozzles are of two main types, the cyclone nozzle and the bordeaux nozzle.

Cyclone nozzle: This is now recommended for most orchard and garden spraying because more nearly than any other type of nozzle it conforms to the ideal of producing the finest droplets, greatest depth of penetration, and greatest volume of delivery with the minimum amount of frictional loss and at moderate pressures.

The principal parts of the cyclone are the disc, whorl chamber, whorl plate, and strainer. The disc is easily replaceable and the range of apertures thus obtainable provides a variation in the fineness of the droplets, though of course this, together with depth of penetration and volume of delivery, is also influenced by pressure. High nozzle pressure has the advantage of

Pressure sprayer in which pressure is first raised by pumping (left) and the spray then released at will by operating the lever on the hand lance. The container can be carried by hand or on the back (above) or left on the ground.

giving greater penetration between the leaves, quicker coverage with less waste, and breaking the spray into a fine mist.

Bordeaux nozzle: With this nozzle the liquid is forced through a tapered aperture drilled in a stopcock so that it may be adjusted to produce a solid stream or fan-shaped spray. The latter is formed where the emerging stream is caused to impinge against a bevelled flange. The resulting spray is coarse and in the effort to obtain adequate coverage much of it will run off and be wasted.

Hose and "Lance"

Hand-operated spray pumps when first bought are often fitted with a hose of inadequate length; 6 to 8 ft. should be considered the minimum for average requirements. The hollow extension rod or "lance" to which the nozzle is attached, and which is used for directing the stream of spray, is also often too short; 18 in. should be regarded as the minimum needed.

Adequate length reduces the risk of spray splashing back on the face, hands, or clothes of the operator and enables the stream of spray to be directed past heavy foliage into the heart of the plant. If the spray lance is bent near the nozzle or the nozzle made so that it can be screwed on at an angle, the sprayer will be more effective.

Dusting versus Spraying

Some advantages of dusting are:

1. Measuring or mixing is not usually required.
2. The speed of application is usually more rapid.
3. Less strongly adhering residue needs to be removed from dusted produce in preparation for cooking.
4. The need for carrying heavy buckets of spray liquid is obviated.

Some disadvantages of dusting are:

1. Certain diseases and, until recently at least, some insect pests could not be effectively controlled by dusting.
2. The adhesion of dusts is inferior to that of sprays and consequently applications usually have to be made more frequently.
3. Dusts can be applied only in the absence of wind, and in New Zealand this very often means that the dusting must be done during early morning or evening.

Spraying Points

Spray thoroughly and at the correct time.

Respray after heavy rain, especially if the spray has not had time to dry.

DO NOT try to spray from only one angle. Several angles are necessary for complete coverage.

Choose a calm day for spraying. (Nicotine sulphate sprays are most effective in hot weather.)

Clean out pump, hose, and spray container after use by forcing clean water through.

Equipment used for spraying with hormone weedkillers should not be used for garden spraying.

Keep poisons locked away and see that the labels are intact.

DO NOT mix more spray than is required and then carelessly leave the excess where it is accessible to children. Pour it away into a hole in the ground. Most sprays deteriorate if kept.

DO NOT spray profusely blossoming plants which are being visited by bees with insecticides such as DDT which remain toxic to insects for a long time, as large numbers of bees may be killed.

When using a combined spray consult a reliable spray-mixing chart to ensure that adverse reactions are not likely to occur, as these may nullify the effect of the spray or cause plant damage.

Keep rubber spray hoses in a cool, dark place. Sunlight causes them to deteriorate rapidly.

Oil the plunger rod and cup leathers of the spray pump periodically with a suitable non-mineral oil. Dust guns also need cleaning and oiling periodically.

Avoid bodily contact with spray material. It is especially important that spray materials should not come in contact with mucous tissue, as they may then be much more readily absorbed.

Go inside immediately and lie down if a headache develops as a result of contact with spray or dust drift. If a serious headache or other symptoms develop, call a doctor immediately.

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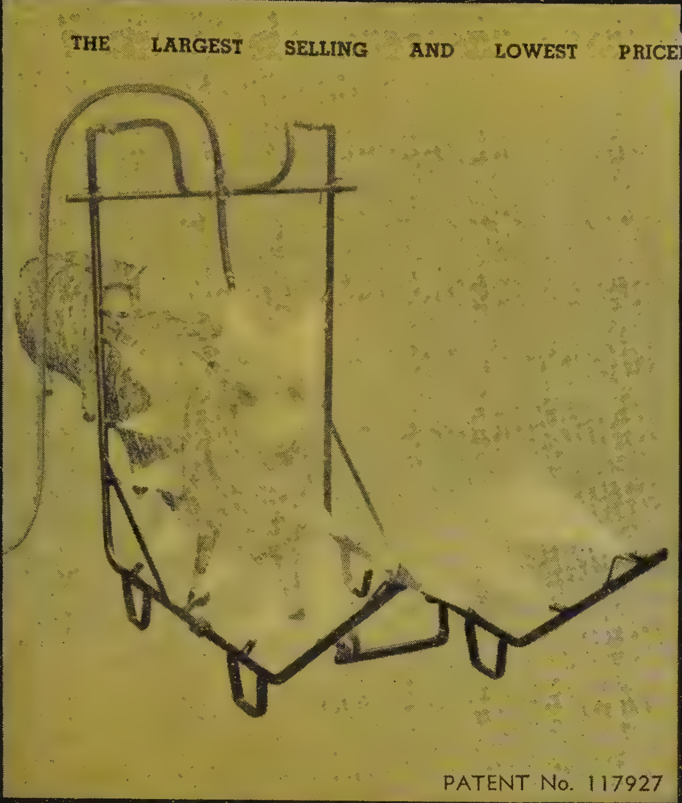

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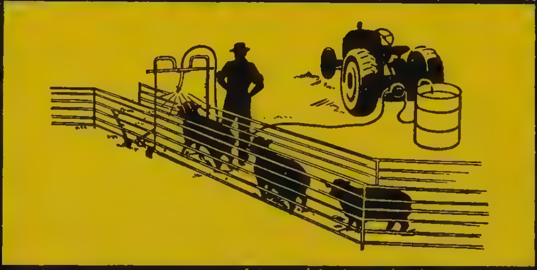

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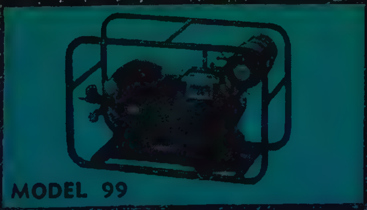
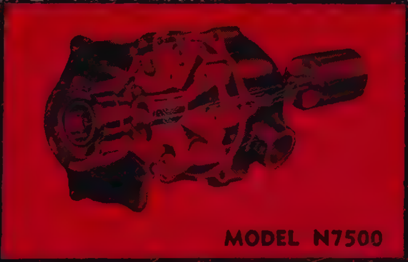

MODEL 99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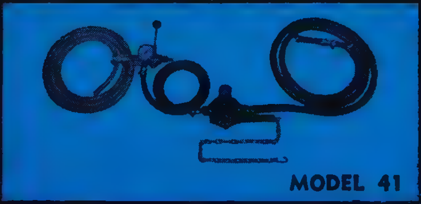
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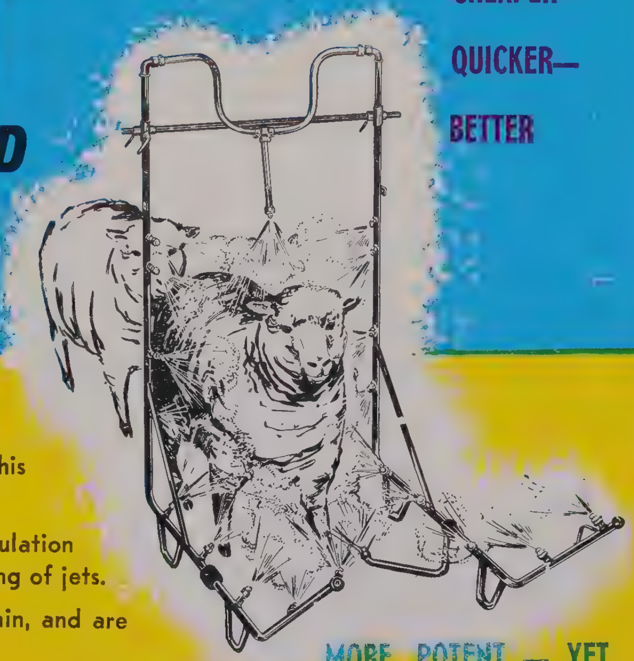

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Hay Fires

By G. R. MOSS, Instructor in Agriculture, Department of Agriculture, Wanganui, and P. DUNNE, Fields Instructor, Department of Agriculture, Westport

The smouldering remains of a load of hay which caught fire while being transported. The burnt-out truck is in the background.

EVERY year hay fires in stacks, sheds, and dumps are numerous and causes of many of these fires are unknown. Little damage may be done when the stack is in the open, but in some seasons replacement hay may be very expensive. Today most hay is baled and stacked in sheds, often in the same shed as the farm machinery, and a fire in these circumstances can cause a heavy loss, as the shed and equipment are often uninsured.

WHEN wet weather makes the harvesting of hay difficult it is sometimes harvested loose and stacked. Excessive moisture in hay is the main cause of burning; hay with less than 30 per cent of moisture will not catch fire.

A fire hazard is constituted more by small pockets of wet material than by an average moisture content which is greater than 30 per cent. Poor consolidation of a stack allows for more air, without which no material can burn, but it also permits heat to escape more readily. Probably the danger is greatest when air is trapped in a consolidated stack, such as when tangled bundles are not teased out when stacked.

A rise in temperature to 120 degrees F. is brought about by respiration in the green portions of hay. This is accentuated to about 158 degrees F. by bacterial fermentation, and the production of volatile combustible gases raises the temperature still further to about 500 degrees F. In localised pockets the formation of the gases causes charring and the caking of surrounding hay. Eventually the pressure of accumulated gases forces a route through the hay, a contact with the open air is established, and the hay readily bursts into flames.

The main requirement is to stack hay only when it is in a fit condition. Should this be impracticable, some of the difficulty can be overcome when building by placing bundles of sticks at 8 ft. intervals across the stack and below the eave. The use of salt in building can be recommended if heating is probable. Salt should be sprinkled over each layer; about 20 to 25 lb. of salt should be used per ton of hay. Salt sprinkled through hay retards the activity of micro-organisms, thus reducing fermentation and heating. Salt also is beneficial to palatability, colour, and aroma.

◆

Causes of Fire

Stacking Damp Hay

Stacking damp hay can cause spontaneous combustion. Once the hay is smouldering control is difficult, as, in most cases, a smouldering stack opened up to the air immediately catches fire.

Cigarette Butts

A cigarette butt thrown out of a moving truck carrying a load of hay can cause a serious fire.

Matches and Lamps

In the Wanganui district recently a truck and its load of hay were burnt when the hay was ignited by the warning lamps on the side of a bridge under repair.

Smoking

Boys slipping away to smoke near stacks have often been responsible for hay fires.

Crackers

Crackers have often been the cause of hay fires.

Tractors or Trucks Backed up to a Stack

Exhaust sparks from badly tuned engines, faulty wiring on petrol engines, or hot bearings have all been known to start fires.

Flying Sparks

A badly sited hay shed or stack can be ignited in a dry season by sparks from a railway engine or from a grass fire caused by sparks. With the change-over to diesel engines, there is less danger of this type of fire.

Precautions

Hay should be Dry

Hay should be dry when harvested and stored in well ventilated conditions.

Siting of Hay Sheds

It is not advisable to build hay sheds close to other buildings.

Hay Stored near Machinery

When hay is to be stored in sheds near valuable equipment, extra care should be taken to ensure that the hay is in good condition. A fire extinguisher or hose should be placed handy.

Vehicles near Stacks

Tractors and trucks, if driven into hay sheds or near stacks, should be well maintained. The parking site should be inspected after the vehicle has moved away.

It's Strawberry Time

STRAWBERRIES are deservedly most popular and probably the best liked of all the small fruits. Besides having great eye appeal they have a luscious, delicate flavour, and if eaten as nature intended them to be—fresh from the garden—require very little preparation. However, for various reasons—variety, to make a few go a long way, or to use up a surplus—they are sometimes used in cooked desserts, and some suggestions for using them will be found in the following article, but for the full enjoyment of this fruit it should be eaten ripe, freshly gathered, and uncooked.

By MAUD B. STRAIN,
Home Science Instructor,
Department of Agriculture,
Dunedin

STRAWBERRIES for eating (though not for jam making) are at their best when fully ripe; at this stage they are firm and juicy and the flavour is well developed and characteristic. Large, perfect berries can be washed, left unhulled, served with sugar, and eaten in the fingers. When cream is served as an accompaniment the fruit is hulled beforehand.

Strawberries may be included in fruit salads and fruit cocktails, and when pureed they make delicious creams and ices and fillings for sponges and shortcakes. They are not often used in cooked sweets, because they lose their shape, colour, and flavour, nor do they bottle very well.

They are highly perishable and remain at their best for a very limited time. Cool storage retards deterioration, but is unsatisfactory for longer than 24 hours. Deep freezing is the most satisfactory way of preserving them, though it is not the complete answer, because on thawing the berries lose their shape and attractive appearance.

The most widely used method of preserving strawberries is as jam, but even for this the fruit lacks essential qualities. Neither the colour nor the flavour is particularly stable; the colour goes on heating and the flavour is masked by a stronger-tasting fruit. Nor is the strawberry well supplied with pectin or acid, both of which are necessary to make jam set.

The juice of other fruits is frequently added to help the setting of strawberry jam, but the flavour of the added fruit should accentuate the strawberry flavour, not mask it. A little lemon juice is most suitable, because it increases the acidity without altering the characteristic flavour. Gooseberry juice, red currant juice, and apple juice are also suitable, because they have good setting qualities and their flavour is not sufficiently pronounced in the quantities used to mask the strawberry flavour; the tendency is rather, by increasing the acidity, to bring out the full flavour of the fruit.

Measures

In the following recipes the standard measuring cup (8 fl. oz.) and standard measuring spoons are used, and all measures are level.

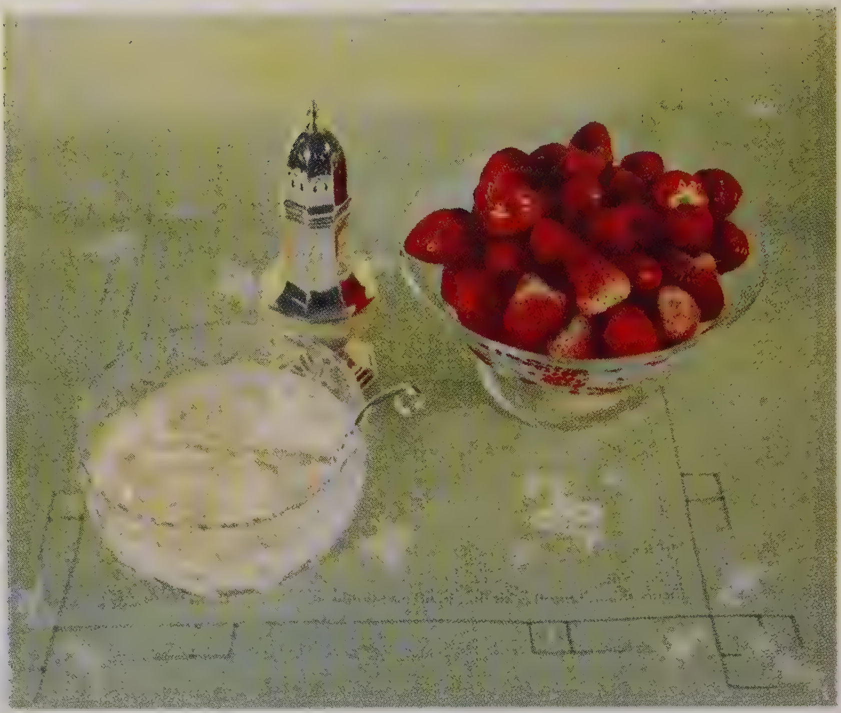
RECIPES

Strawberries in Syrup

Strawberries lose some of their bright colour when cooked and, if not cooked carefully, their shape. The following is a reliable method, provided the fruit is not allowed to overcook:

Put the strawberries in a flat baking dish or casserole and sprinkle them liberally with sugar. Add water to within three-quarters of the level of the strawberries in the dish and cover with grease-proof paper or the casserole lid. Cook gently in the oven at 300 degrees F. for up to 10 minutes. (The time depends on the degree of

IT'S STRAWBERRY TIME



The fare offered Curly Locks in the old nursery rhyme: strawberries, sugar, and cream.

ripeness of the fruit. Fully ripe fruit should be removed from the oven as soon as simmering point is reached.) Lift the dish out of the oven and leave the fruit covered. Do not disturb the fruit, but serve from the dish in which it was cooked.

Syrup

Some recipes using fresh strawberries (for example, strawberry flan) require extra juice. This syrup serves the purpose satisfactorily.

¼ pint of water
4 oz. of castor sugar
Juice of ½ lemon
1 dessertspoon of red currant jelly
1 teaspoon of cornflour
Cochineal (optional)

Put the sugar and water in a small saucepan. Dissolve the sugar and boil the mixture for 3 to 4 minutes. Add the red currant jelly, lemon juice, and cornflour mixed with a little cold water. Cook, stirring well, until the syrup is clear. If necessary, add a drop or two of cochineal to improve the colour.

Glazed Strawberries

1 lb. of firm ripe strawberries
½ lb. of raspberries
¼ pint of cream
Vanilla
2½ oz. of icing sugar (sieved)

Put the strawberries in the bowl from which they are to be served. Pass the raspberries through a fine sieve. Fold in the sieved icing sugar. Pour this raspberry puree over the strawberries, being careful to cover all of them. Chill. Whip the cream, sweeten it and flavour it with vanilla, and just before serving pile the cream on the chilled fruit.

Strawberry Fool

1 lb. of fresh strawberries
2 oz. of castor sugar
Or
1 tin of strawberries
½ pint of evaporated milk, cream, or thick custard
Juice of 1 lemon
Berries, nuts, or whipped cream to decorate

Sieve the strawberries and add the sugar to the puree. If tinned strawberries are used, pour off the juice and sieve the fruit; if the puree is very thick, a little of the juice can be added. Whip the evaporated milk or cream until it is thick and add to it or to custard the lemon juice and fruit puree. Mix well and pile into a glass dish or individual glasses. Decorate with whipped cream and whole berries or chopped nuts.

Gelatine Desserts

Strawberry Whip

2 teaspoons of gelatine
¼ cup of cold water
½ cup of fruit juice
2 tablespoons of sugar
1 teaspoon of lemon juice
¼ cup of strawberry puree
1 egg white
Whipped cream

Soak the gelatine in a small amount of cold water until it is soft. Heat the gelatine over hot water until it has dissolved and add half the sugar to the gelatine and stir until the sugar has dissolved. Add the remainder of the water and the fruit juice. Chill until thick but not set and then beat until light and foamy. Fold in the strawberry puree and lemon juice. Beat the egg white to a foam, add the remaining sugar, and beat to a stiff foam. Fold this into the gelatine mixture. Pile into serving dishes and garnish with whipped cream and whole strawberries.

Strawberry Cream (Fresh Fruit)

1 lb. of strawberries
4 oz. of sugar
¼ pint of water
½ pint of strawberry jelly (packet)
½ pint of cream (whipped)

Make a syrup of the sugar and water. Cook the strawberries in the syrup in the oven until tender. Allow to cool and sieve. Whip the jelly to twice its volume and combine it with the whipped cream. Add the strawberry puree and pour into moulds to set.

Strawberry Cream (Using Jam)

½ pint of strawberry jam
¼ pint of cold water
1 teaspoon of lemon juice
4 oz. of castor sugar
½ pint of cream
½ oz. of gelatine

Soak the gelatine in the cold water and when it is fully expanded heat gently until the gelatine has melted. Dissolve the castor sugar in the warm gelatine mixture and add the lemon juice. Rub the jam through a sieve and add the gelatine mixture to the sieved jam. Whip the cream and add it lightly to the jam mixture. When the mixture is on the point of setting pour it into a mould and leave until set. Turn into a glass dish and decorate with whipped cream and whole strawberries or chopped-up strawberry jelly.

Strawberry Bavarian Cream

1 tablespoon of gelatine
¼ cup of sugar
⅛ teaspoon of salt
2 egg yolks
¼ cup of water
1 cup of sliced strawberries
1 teaspoon of grated lemon rind
1 tablespoon of lemon juice
2 egg whites
2 tablespoons of sugar
1 cup of cream (whipped stiffly)

Mix the gelatine, ¼ cup of sugar, and salt together in the top of a double boiler. Beat the 2 egg yolks with the water and add the sliced strawberries. Add this to the mixture in the double boiler and cook over boiling water, stirring constantly until the gelatine is dissolved. Remove from heat, add the grated lemon rind and juice, and chill to the point of setting. Beat the two egg whites stiffly and beat in the 2 tablespoons of sugar. Fold this into the gelatine mixture. Fold in the whipped cream and put in a mould to set. Unmould and garnish.

Strawberry flan (left front), strawberry cream (in glass dishes), and strawberry chiffon pie (right front).

Variation

With only a slight alteration to the final moulding this cream can be made into party fare. Cover the bottom of the mould with a layer of the cream and allow it to set. Cover it with a layer of sponge fingers that have been soaked in rum and then with a layer of fresh halved strawberries. Cover these with more cream mixture, another layer of strawberries, and finally a layer of cream. Refrigerate until set, unmould, and garnish with whipped cream and strawberries.

Strawberry Chiffon Pie

1 pint of fresh strawberries
4 oz. of sugar
1 tablespoon of gelatine
¼ cup of cold water
½ cup of hot water
1 tablespoon of lemon juice
1 to 2 cups of cream (whipped)
2 egg whites
2 oz. of sugar
Biscuit-crumb pie shell

Crush the strawberries and cover with the 4 oz. of sugar and leave for 30 minutes. Soften the gelatine in the cold water and then dissolve it in the hot water. Add the strawberry mixture and lemon juice. Leave until on the point of setting; then fold in the whipped cream. Beat the egg whites stiffly and add the 2 oz. of sugar gradually, beating until the mixture forms in stiff peaks. Fold this into the strawberry mixture and pile it all into the biscuit-crumb pie shell and chill until it is firm.

Biscuit-crumb Pie Shell

6 oz. of biscuit crumbs (maltmeal, ginger nut, breakfast flakes, etc.)
3 oz. of butter

Melt the butter and add the biscuit crumbs. Mix well and line a pie plate with the mixture, pressing it firmly against the bottom and sides of the plate. Chill until firm.

Strawberry Flan

Flan Pastry

4 oz. of flour
2 oz. of butter
⅛ teaspoon of salt
1 egg yolk
1 teaspoon of sugar
Cold water to mix

Rub the butter into the flour with the tips of the fingers or cut it in with a pastry blender. Add the sugar and salt. Beat the yolk of the egg with a little cold water and mix this into the flour mixture to form a stiff dough. Allow the dough to stand for an hour in a cold place. Roll out ¼ in. thick and line a round 7 in. tin. Run the rolling pin over the top of the tin to cut off the excess pastry evenly.

Fit a circle of grease-proof paper on the pastry lining the bottom and fill the case with barley or dried beans or bread crusts to prevent the pastry from rising. Bake at 425 degrees F. for 15 to 20 minutes until the pastry has set and is slightly coloured.

Remove the bread crusts and paper from the bottom of the case and return the case to the oven for a minute or two to dry off the bottom.

Delightfully easy and appealing summer dessert: Strawberries and ice cream.

When the case is cold fill it with small strawberries or sliced strawberries. Cover the fruit with a glaze (see "Glazed Strawberries", page 590) and when it has set decorate the flan with whipped cream. Instead of a glaze a cup of jelly made from strawberry jelly crystals can be used. When the jelly has cooled pour it over the strawberries in the flan case and leave it to set. Garnish with whipped cream.

Strawberry and Rhubarb Pudding

1 lb. of rhubarb
½ lb. of strawberries
½ pint of water
3 oz. of loaf sugar
2 tablespoons of gelatine
1 tablespoon of lemon juice

Boil the water and loaf sugar together for 2 to 3 minutes to make a syrup. Place the rhubarb (prepared) and the strawberries in a casserole, pour the syrup over them, and cook gently in the oven until tender. Soak the gelatine in 3 to 4 tablespoons of cold water. Pour off the juice from the cooked fruit, add the soaked gelatine to the hot liquid, and stir until the gelatine has dissolved. Add the lemon juice and sufficient cold water to make 1 pint of juice and set it aside to cool. Line a deep dish or basin with sponge cake or sliced Swiss roll, put a layer of mixed fruit in the dish, and pour in sufficient of the cold gelatine mixture to cover the fruit. Allow this to set. Cover the top with sponge cake and pour over it the remainder of the gelatine mixture. Chill. Garnish with whipped cream.

Frozen Desserts

Strawberry Ice Cream

⅔ cup of sweetened condensed milk
½ lb. of strawberries
2 oz. of castor sugar
1 cup of thick cream
½ cup of water

Crush the strawberries and sweeten with the sugar. Blend the condensed milk, water, and sweetened strawberries thoroughly, pour into the freezing tray of a refrigerator, and freeze until ice crystals form round the sides of the tray. Whip the cream stiffly, fold it into the milk mixture, and freeze. When partly frozen scrape the mixture from the sides and bottom of the tray and beat until smooth but not melted. Freeze until firm.

Strawberry Mousse

¾ lb. of ripe strawberries
6 oz. of castor sugar
1 tablespoon of lemon juice
A few grains of salt
1 pint of cream

Crush the strawberries to a pulp and sprinkle with the sugar. Add the lemon juice and a few grains of salt. Whip the cream stiffly, mix it with the fruit, and freeze.

Strawberry Sherbet

2 tablespoons of gelatine
3 cups of cold water
1 cup of boiling water
2 cups of sugar
1 cup of strained strawberry juice
3 tablespoons of lemon juice

Soften the gelatine in half a cup of the cold water and dissolve it in the boiling water. Add the sugar, fruit juices, and remaining cold water. Strain and freeze.

* * *

Other Desserts

Strawberry Batter Pudding

8 oz. of flour
4 oz. of fresh strawberries
½ teaspoon of salt
2 eggs
1 pint of milk

Sift the flour and salt together. Whisk the eggs and add to ½ pint of the milk. Blend the egg and milk mixture with the flour and salt and beat to a stiff batter. When smooth add the remainder of the milk, a little at a time, beating well after each addition. Pour the batter into a well greased, pre-heated baking tin. Sprinkle with the strawberries and bake for 25 to 35 minutes at 425 degrees F.

Strawberry Upside-down Cake

Topping

1½ oz. of butter
3 oz. of brown sugar
24 (about) strawberries

Melt the butter in an 8 in. square pan and sprinkle with the brown sugar. Arrange the strawberries (previously cooked lightly in thick syrup in the oven) symmetrically in the sugar-lined tin.

Cake Batter

3 oz. of butter
4 oz. of sugar
1 egg
1 teaspoon of vanilla
¼ teaspoon of salt
1½ teaspoons of baking powder
½ cup of syrup from strawberries
10 oz. of flour

Cream the butter, add the sugar gradually, and continue creaming until fluffy. Add the egg and vanilla essence and beat well. Sift together the flour, salt, and baking powder. Add alternately small amounts of the sifted dry ingredients and fruit syrup to the butter mixture, beating smooth after each addition. Spread the batter over the strawberries in the pan and bake in a moderate oven (350 degrees F.) for 50 to 60 minutes. Let stand for 5 minutes; then turn out on to a plate. Serve with cream.

Strawberry Shortcake

6 oz. of flour
3 oz. of butter
2 oz. of sugar
1 egg
¼ teaspoon of salt
2 teaspoons of baking powder
Milk to mix

Cream the butter, add the sugar, and cream again until light and fluffy. Beat the egg and add it to the creamed mixture. Sift the flour, baking powder, and salt and add them with a little milk to the cake mixture to make a medium soft dough. Divide the dough into two equal parts. Pat out one portion to fit a pie plate, making a layer ¼ in. thick. Brush the top lightly with melted butter. Shape the second portion of dough in the same way and place over the first. Bake for 20 to 25 minutes in a moderate oven (375 degrees F.). Separate the two layers. Spread one layer with creamed butter, sprinkle with castor sugar, and put on crushed and sweetened berries. Place the other layer on top. Spread fruit mixture on this and top with whipped cream. Serve at once.

Strawberry Crumb

½ pint of strawberry jam
4 oz. of breadcrumbs
2 egg yolks
2 egg whites
1 oz. of sugar
1 pint of new milk
4 tablespoons of sugar

Butter a piedish and spread the jam over the bottom. Soak the breadcrumbs in the milk in a saucepan for 10 to 15 minutes. Beat the egg yolks lightly. Heat the milk and breadcrumb mixture to simmering point, stirring carefully to avoid burning, cool, and stir in the 1 oz. of sugar and the beaten egg yolks. Pour this over the jam in the piedish and bake in a moderate oven (325 to 350 degrees F.) for about ½ hour or until just set. Beat the egg whites stiffly and fold in the 4 tablespoons of sugar. Pile this meringue on top of the pudding and return it to the oven to brown lightly.

Strawberry Sauce for Ice-cream

½ cup of sugar
⅓ cup of water
½ lb. of strawberries

Boil the sugar and water to make a syrup and add the crushed strawberries. Remove from heat and chill before using.

Strawberry Sauce for Hot Puddings

2 cups of strawberries
2 tablespoons of butter
1 egg white (stiffly beaten)
1½ cups of icing sugar
1 tablespoon of granulated sugar

Place the strawberries in a bowl, add the granulated sugar, and mash slightly. Refrigerate until time to serve. Beat the butter to a cream and add the icing sugar gradually, working it in thoroughly. Add the stiffly beaten egg white. Just before serving mix in the mashed berries.

Strawberry Jams

The most satisfactory way of using up small or misshapen strawberries and those not suitable for other purposes is to make them into jam. Strawberry jam is always a favourite and a little used in a dessert will often lift it from the commonplace to something special.

Though successful jam can be made without the addition of any other fruit to assist setting, the strawberries must be sliced or crushed to free the maximum amount of pectin and juice, there should be a mixture of ripe (for flavour) and not quite so ripe (for pectin) berries, and the jam should be made early in the season. Often gooseberry, red currant, rhubarb, or apple juice is used to aid setting, in the proportion of ½ pint of juice to 4 lb. of strawberries. Lemon juice is also very satisfactory; it increases the acidity and brings out the full flavour of the strawberries without altering their flavour.

Strawberry Jam

6 lb. of strawberries
4½ lb. of sugar
Juice of 3 lemons

Hull the strawberries and wash off any earth or sand. Slice or crush the berries, add the sugar, and allow to stand until the juice has soaked through the sugar. Add the lemon juice and bring to the boil. Boil quickly until a little put on a saucer shows signs of setting or until when the stirring spoon is lifted the jam drops off slowly in wide drops. This may take 10 minutes, or longer, but great care should be taken not to overcook the jam; the less it is boiled the better the flavour will be. Pour into warmed jars, cover, and store when cold.

Whole Strawberry Jam No. 1

6 lb. of small strawberries
4½ lb. of sugar
Juice of 4 lemons

Prepare the strawberries, put them in the preserving pan, and put 3 lb. of sugar over them. Leave overnight. Next day add the remainder of the sugar and the lemon juice and heat carefully until all the sugar has melted, stirring well to prevent burning. Boil rapidly for about 10 to 15 minutes.

As soon as the jam shows signs of setting remove it from the heat and allow it to cool a little before putting it into pots; this gives a more even distribution of the fruit through the jam. Cover and store.

Whole Strawberry Jam No. 2

6 lb. of strawberries
6 lb. of sugar
2 cups of red currant juice (3 lb. of red currants and ½ pint of water)

Heat the red currants slowly with the water until they are very soft, crush the berries, and strain the juice from them. Boil up 2 cups of this juice with the sugar for 5 minutes, add the strawberries, and boil until the jam gives the setting test. Allow to cool partially before pouring into warmed jars. Cover and store.

Gooseberries or rhubarb can be used similarly to the red currants.

Deep Freeze Strawberries

Strawberries can be frozen either whole or as a puree. The puree has many culinary uses. If whole strawberries are to be eaten as fresh berries, they should be eaten before they have completely thawed, since they lose their firmness on thawing.

The best method of preparing strawberries for home freezing is to pack them in dry sugar. Select berries that are fully mature but firm, highly coloured, and of distinct flavour and freeze them within an hour or two of picking. Wash in cold water, sort carefully, and prepare as for table use. Drain well. If the berries are sliced and chopped, they retain their flavour better. They also pack more conveniently than whole berries.

Use 2 cups of sugar (1 lb.) to 4 lb. of berries. Mix thoroughly with sugar and then fill containers, leaving a little (about ½ in.) head space for expansion on freezing. Seal the container securely and place immediately in the freezer and store at zero temperature (0 degrees F.). If the packaged fruit must stand for a short time before freezing, put it in a refrigerator.

Strawberry Syrup

Strawberries for syrup must be dead ripe—too ripe for jam making—as at this stage the fruit yields its juice most readily. Put the clean fruit into a large saucepan, allowing ½ pint of water to each 6 lb. of fruit. Crush the fruit and heat it very slowly until the juice flows. Crush the fruit again to press out as much juice as possible. Let it come to boiling point, but to retain the maximum colour and flavour do not let it boil.

Strain the fruit through a colander (this lets some fruit through and gives a better vitamin C content) or pour it into a scalded jelly bag and let it drip overnight. Squeeze the jelly bag to extract as much juice as possible. Add 3 oz. of sugar to each pint of juice and heat the juice to dissolve all the sugar. Fill into sterilised hot bottles to within 1 to 2 in. of the top. Cork or crown seal the bottles; corks must be tied. Place bottles on their sides in a water bath at the same temperature as the juice. Heat to 180 degrees F., keep at that temperature for 20 minutes, and then cool.

When bottles are cold the corks and ½ in. of the tops should be dipped in melted wax to give a complete seal. Store in a cool, dark place.

Begonias for Foliage in the Flower Garden

BEGONIAS show an amazing diversity in growth habits, shape, colour, and texture of the leaves, and in the size and colour of the flowers. They have been popular garden and glasshouse plants for many years and now with the vogue for house plants a new interest is being shown in many of the kinds grown mainly for their foliage. This article describes some of them and their culture.

[*Sparrow*

▲ When grown inside in poor light *Begonia lucerna* does not flower freely, but develops very large and beautiful dark green leaves with silver spots and a satin-like sheen.

▼ *B. manicata* flowering profusely.

THE story of the introduction of begonias into cultivation is fascinating. First discovered in the West Indies nearly 300 years ago, it was not until about a century later that the first plants survived the journey to Europe. At this time French and Spanish explorers were very active in that part of the world and many of them were accompanied by doctors and scientists in search of plants which could be used as food or which had some medicinal value. Their finds among the begonias were disappointing in those respects, but introduced into cultivation a collection of extremely interesting and attractive plants.

Later, botanists, sailors, and professional plant hunters sent out by nursery firms introduced many more from the northern part of South America and Mexico. These were followed by introductions from Africa and then from India, China, and all the countries through to the East Indies.

Today, there are over 2,000 species known, of which about 200 are cultivated. It is not surprising that with such a wealth of material available, hybridists were soon at work and over the years have produced innumerable hybrids and varieties which have largely superseded many of the true species. The modern large-flowered tuberous begonia, for example, has been developed from some 5 or 6 species from various parts of South America.

With introductions being made from so many parts of the world by many people and the flood of hybrids, names soon became confused, but much has been done in recent years by American and English enthusiasts and societies to sort them out. Many begonias are found in New Zealand gardens, but very few owners have any idea of their names. Where plants are named many are obviously incorrect when checked against published descriptions, but the correct name remains elusive.

Begonias may be divided into three broad groups, fibrous-rooted, rhizomatous, and tuberous-rooted. The fibrous-rooted group includes the upright-growing cane types, which are popular garden subjects in the warmer parts, and *B. semperflorens*, used for summer bedding. Rex begonias are the best known in the rhizomatous group and the tuberous group includes the large-flowered hybrids and the multifloras which flower in summer and winter-flowering Gloire de Lorraine types. This article deals with the first two groups.

By J. S. SAY,
Horticulturist,
Department of Agriculture,
Auckland

Cane Begonias

In frost-free areas many cane types can be grown easily in the open. The bold leaves and large clusters of red flowers of *B. lucerna* are striking features in many Auckland gardens, especially where contrasted against white or light-coloured walls.

When growing in the open, cane begonias require good drainage, a soil which does not dry out too badly in summer, and a position sheltered from winds. They do better against a wall or in the angle of two walls than in an open position or among shrubs. In shady positions the foliage is usually larger and softer and the flowers fewer and often paler. In full sun the leaves of the red-tinged varieties tend to be harder and more highly coloured and the plants generally flower more profusely.

Apart from thinning out some of the older canes occasionally to encourage young growths from the base and a light pruning in early spring of some of the more bushy varieties, they require practically no attention. They seem to be free of serious pests and diseases.

The cane types make ideal pot plants for glasshouses or indoors. They like a soil mixture with good drainage and plenty of leaf mould or compost which will hold moisture and yet give good drainage and aeration. They should be kept fairly moist, but should never be waterlogged.

In the glasshouse they require good light if they are to flower freely and to bring out the red in the leaves of some kinds, but some shading is necessary during summer. Those which are grown mainly for leaf effect (except the red-tinged) are usually more attractive when grown with less intense light. They like a fairly humid atmosphere.

As house plants they cannot be depended on to flower freely unless they are in good light in a room facing more or less to the north, but they should not be stood in the direct sun in summer. The lack of flowers is more than compensated for by the very beautiful foliage they develop in less intense light. Species and varieties with silver-spotted leaves are particularly good. In very poor light they become drawn and leggy.

In rooms where light comes from only one direction most begonias quickly turn their leaves toward it. They are then better stood against a wall and developed as one-sided plants rather than trying to get a symmetrical shape by frequent turning. To keep a humid atmosphere about them they should be grouped together or with other plants or stood in a trough or on a tray with damp sand or gravel in the bottom.

Some of the most popular cane types growing in New Zealand are:

B. aconitifolia: Large, palmate, dark green leaves with silver spots and splashes. Erect habit with few side branches; 3 to 4 ft. Makes a good house plant. This begonia is often incorrectly called *B. faureana* or *palmata* and is similar to *B. sceptrum* and *B. diadema* and may be listed under any of these names.

B. coccinea (syn. *B. rubra*): The parent of many hybrids with similar characteristics. Grows very tall and plants up to 10 to 12 ft. are not unusual in Auckland. Bright green leaves with regular outlines and sometimes reddish margins; large clusters of pink or red flowers.

B. corallina: Similar to above.

B. dielytra: Similar to but not as tall as *B. coccinea*, which is one of its parents. The flowers are pale pink with deeper pink ovaries.

B. lucerna: Believed to be a hybrid of *B. corallina*. This is very popular in warmer districts, where it will grow to a large plant 6 to 8 ft. high, with large clusters of red flowers for most of the year. The leaves are large with slightly angular lobes, silver spotted, and red beneath. Makes a good house plant.

President Carnot (*B. corallina x olbia*): Somewhat similar to *B. lucerna*, but the leaves are slightly crinkled, faintly silver spotted, and tinged with red on both sides. Bears very large trusses of red flowers.

B. argento-guttata: Grows to 3 to 4 ft. and branches freely so that it has a spreading rather than upright habit. Dark green leaves, silver spotted, and red beneath. The flowers are creamy white or tinged with pink.

B. maculata wighti: Grows to 4 to 5 ft. and is rather bushy. Thin, green, cane-like stems, dark green leaves spotted with silver, edges not toothed or lobed. Whitish flowers in pendulous clusters.

All of the above, together with *B. undulata, olbia, dichroa, teuscheri*, and others, have been crossed and recrossed to give many hundreds of hybrids. It is likely that many of them are growing unnamed in New Zealand gardens.

One of the most interesting cane begonias is *B. glaucophylla* (syn. *B. limminghei*), which has a slender, trailing habit and makes a good plant for a hanging basket. The leaves are glossy, slightly greyish green, and sometimes with wavy edges. The flowers are coral red and grow in tight clusters and though they do not open as a rule they make a good show in spring. The buds are sometimes striped with white or pale pink. It could be used as a trailing pot plant in the house, but cannot be depended on to flower unless light is very good. Direct sun should be avoided, especially in summer months. It seems to prefer a warmer and more humid atmosphere than the cane types already described.

Two other popular begonias in the fibrous group are *B. scharffi* and *B. metallica*. The former, more commonly called *B. haageana*, has a fairly upright habit and forms a bush 2 to 3 ft. high. The leaves are dark green above, reddish beneath, and covered with short, white hairs, giving them a very soft appearance. The flowers are borne in fairly tight clusters on long stems. They are white or pink and covered with red hairs and are produced over a long period. As a rule only a few open, the others remaining in bud form. It will grow outside in warm districts, but for luxuriant foliage it is better in a glasshouse or indoors. It likes more shade than the cane types previously described.

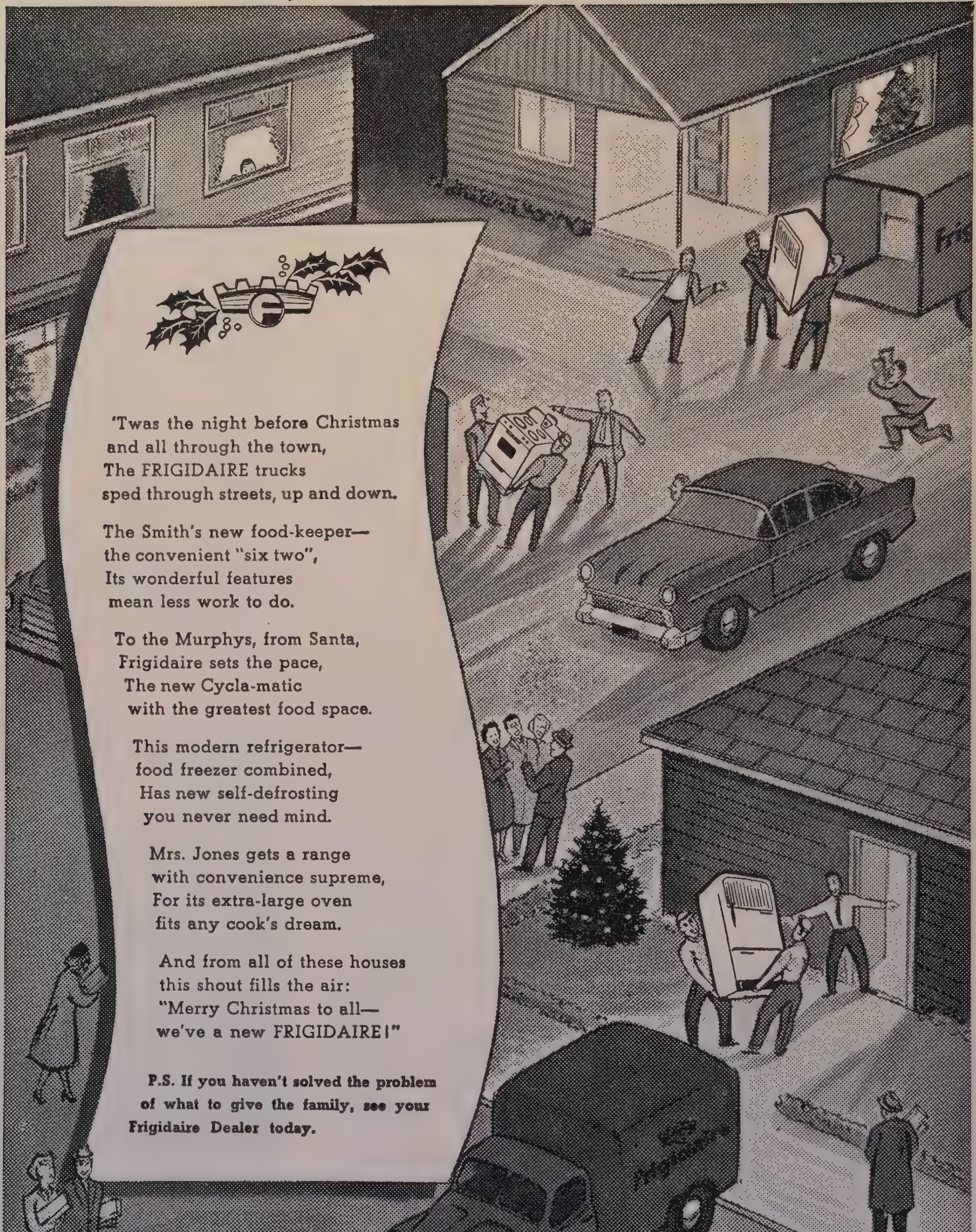
B. metallica is similar, but the leaves have a very pronounced metallic sheen under the hairs. Both have given rise to many hybrids, one of which is *B. thurstoni* (*B. metallica x B. sanguinea*). It makes a fairly bushy plant about 2 ft. high. The stems and leaves are almost smooth. The leaves are a shining bronzy green and red beneath, and the flowers, in erect clusters, are pink. It makes a very good house plant.

[*Sparrow*

▲ *Begonia lucerna* with its large clusters of red flowers and bold foliage looks well against a white wall.

▼ *B. coccinea* is one of the most vigorous of the cane begonias and sometimes grows to 10 or 12 ft. in warmer districts. The red or pink winged seed vessels often remain on the plant for some weeks after the clusters of flowers have fallen. It makes a good pot plant for indoors or glasshouse.

[*Sparrow*



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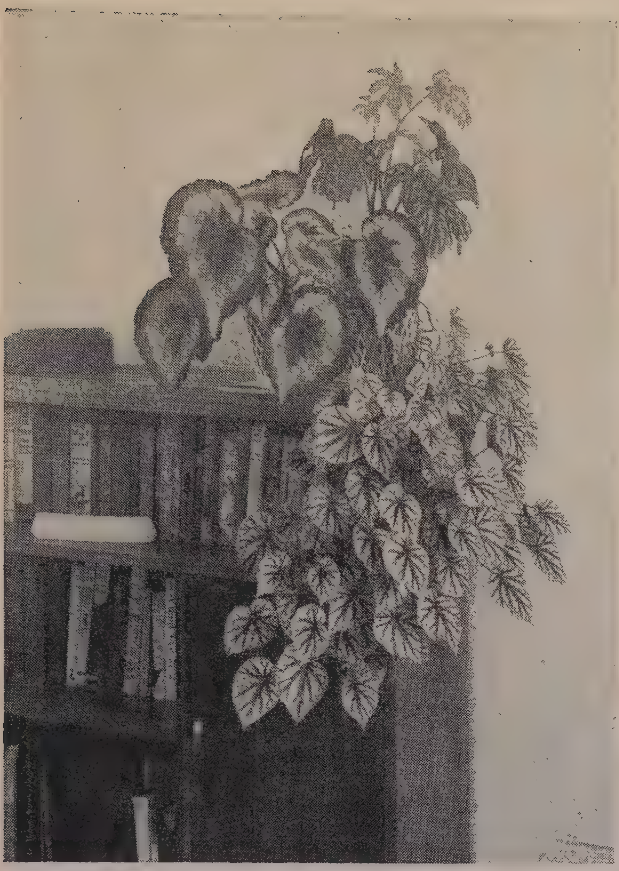

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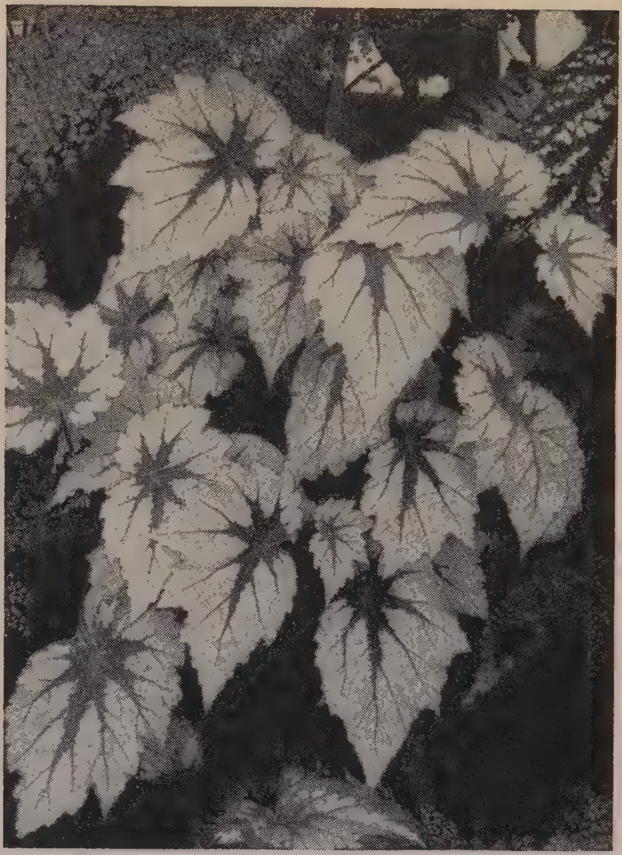


[*Sparrow*

Left—Begonias make delightful house plants. *B. aconitifolia* at the top has large, dark green, palmate leaves with silver splashes. The Rex variety in the middle has green leaves with a broad, silvery pink band. The variety at the bottom is usually called Silver Wings, but there is some doubt about its correct name. The leaves are 2 to 3 in. long, green about the veins, and silver between. It usually forms a compact bush, but under poor light it develops a lax, trailing habit. Right—A Rex hybrid developed by an Auckland amateur. It has an upright habit and bright silver leaves.

Another species which is occasionally seen is *B. luxurians.* The very slightly hairy leaves are unlike those of most other begonias, for they are compound, being divided into about 16 narrow leaflets, giving the plant a palm-like appearance. Grows to about 5 ft. The flowers are insignificant, but it is excellent for foliage effect.

B. fuchsioides is another popular species. It forms a bush 2 to 3 ft. high and has dark green glossy leaves and pendant red flowers, both of which resemble fuchsias as its name suggests. In frost-free areas it is a very useful plant in mixed flower borders and makes a colourful, informal dwarf hedge. Makes a good pot plant and indoors will flower freely in good light.

Rex Begonias

The modern varieties of Rex begonias have been developed from the original species found in Assam about 100 years ago and are the most popular of the rhizomatous group. A wonderful selection is now available, smooth leaves of silver or pink, green with blotches and spots of silver, and various shades of pink, red, and green covered with soft silky hairs. Sometimes the colours merge or they may be in distinct bands, patterns, or spots. Leaf size varies from 2 to 3 in. across to 8 in. or more according to variety.

They are very easily grown and make good pot plants for the glasshouse or indoors and usually do remarkably well when grown in beds under benches in a glasshouse. The original species grows naturally in warm, semi-shady, humid forests in leaf mould over shallow soil or rock, and the modern hybrids do best if these conditions can be duplicated. The rhizome creeps along the surface of the ground, usually rooting as it goes. The root system is very shallow. For these reasons they are better grown in shallow pans rather than ordinary flower pots and need a light, open mixture with plenty of sand and leaf mould. To develop the best colour they require good light but not direct sun, and they like a humid atmosphere in summer. The leaves sometimes rot off in winter in glasshouses because of too moist conditions and drips. Damaged leaves and some of the older ones should be cut off in early spring.

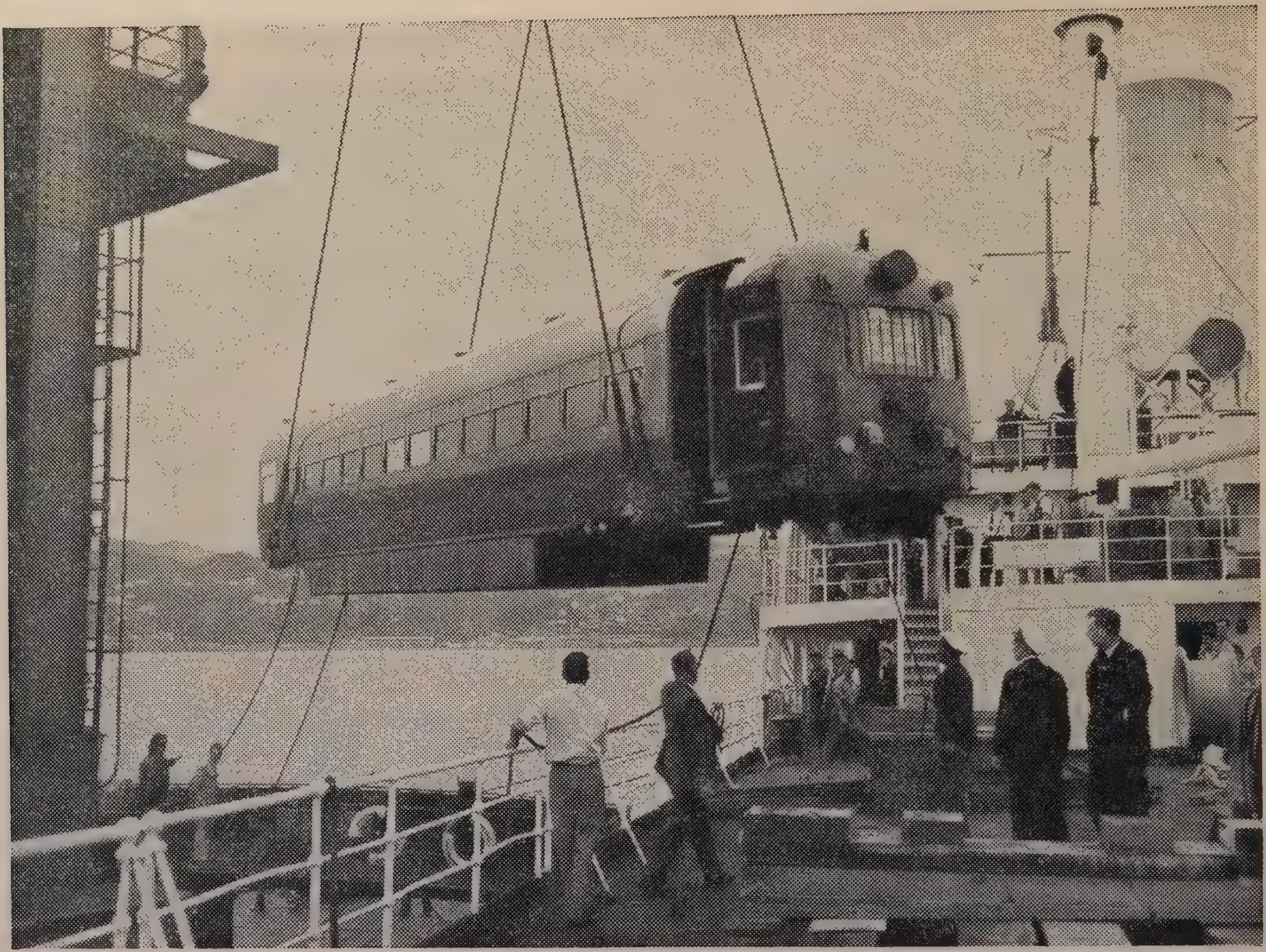
When repotting, some of the dormant part of the rhizome should be cut off if the growing parts are well rooted, and the plant is better placed to one side of the pot with the growing tip pointing to the opposite side. It will then have the maximum time to develop before the rhizome strikes the side of the pot.

Rex begonias have been crossed with other types to give plants with upright and branching habits with typical Rex leaves.

Other Rhizomatous Begonias

A number of rhizomatous begonias are valued because of their winter flowering habit in addition to attractive foliage. All the following need the same treatment and conditions as Rex begonias.

Iron Cross: This is an outstanding begonia of fairly recent origin which is now available in New Zealand. The



Strange Cargo

It sounds a simple enough matter to put a given quantity of goods into a known volume of space. But, as everybody knows who ever tried to pack the holiday luggage in the boot of the car, it is never as simple as it looks. And that certainly goes for loading a ship.

If you put too much weight up top a ship will become unstable; might even capsize, if the process is carried to extremes. Put too much weight fore and aft and you run the risk that she will break her back in bad weather. Weight distribution has to be precise. But that is our job; and while the stowage of New Zealand's exports is difficult enough, the problems on imports are even more substantial, because they vary so much more in bulk and weight. Tractors and tinplate, chemicals, cars, all have to be stowed in such a way that they are available in the right sequence at the various ports of discharge. Railway engines and coaches too, have to be specially stowed.

And when you think you've worked out all the answers, there still remains the matter of oil and water.

The ship's requirements of these essential commodities add up to a very considerable amount for each leg of the outward voyage, and both are being constantly consumed. Therefore, the ship that leaves London correctly loaded may be as much as 1,000 tons lighter—and over a foot and a half higher out of the water – when she reaches Curacao, her main bunkering port. And because it is at this moment that a ship will be least stable, calculations for her loading must all be based on it.

It's complicated, to say the least of it, and almost every day of the year somebody, somewhere, is busy with slide rule and computers, working out cargo loadings.

And it is a tribute to the work of people seen and unseen — to the Freight and Traffic Departments and Cargo Superintendents, on the one hand, to the watersiders on the other, and especially to the Masters, Officers and Crews who sail the ships – that cargoes *do* arrive safely, and that the trade by which we live continues to flow.

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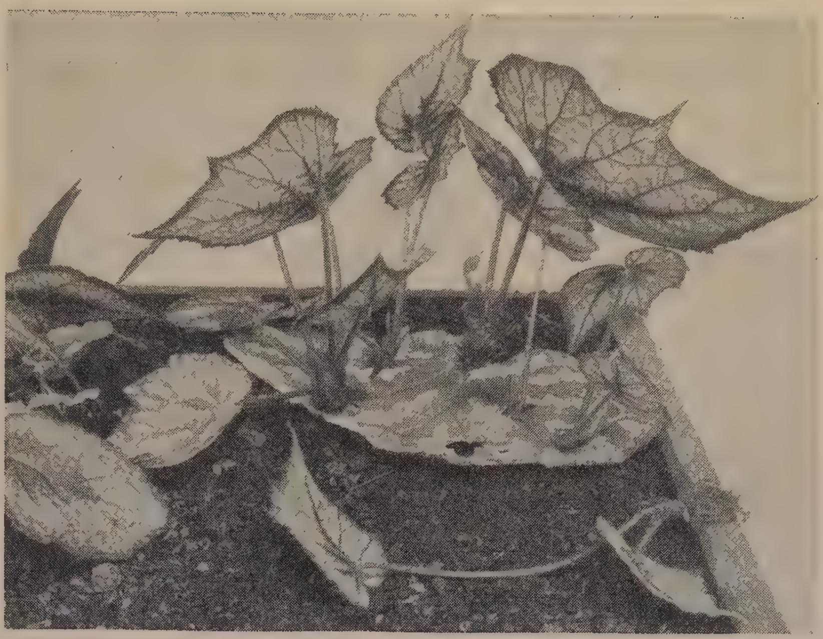

[Sparrow

Rex begonias grow easily from leaf cuttings. The leaves are pegged flat on to a sandy mixture after the main veins are cut. Plants will grow at each cut.

leaves are rather like those of Rex begonias in shape, but are rough and pimpled. The colour is bright green with a bold cross-shaped, dark brown marking on each.

B. nelumbiifolia: Very large, light green leaves which resemble water lily pads. White or pale pink flowers in erect panicles.

B. manicata: Leaves pale green, fleshy, and smooth with the edges slightly toothed and hairy and a collar of red hairs at the top of the leaf stalk. Tall panicles of pale pink drooping flowers in winter and early spring (often incorrectly called *B. feasti*). *B. manicata aureo-maculata* has yellow spots on the leaves.

B. erythrophylla (syn. *B. feasti*): Almost round, fleshy, dark green leaves with a red reverse. Pink flowers in tall panicles in winter and early spring (often confused with *B. manicata*).

B. heracleifolia: Large, dark green, palmate leaves with very long and hairy leaf stems.

B. ricinifolia: A hybrid of *B. heracleifolia*. Has large leaves like those of castor oil plant; leaf stems hairy and very long; pink flowers in tall panicles. Also makes a good hanging basket plant.

B. fuscomaculata (syn. *B. rubellina*): Another hybrid of *B. heracleifolia*. Leaves large, ovate, with slightly toothed edges and covered with irregular spots of chocolate. Petioles hairy and very long. Makes a very striking basket plant. The older leaves hang down and will completely hide the basket.

B. caroliniaefolia: Has very thick rhizomes and large palmate leaves with 6 to 8 leaflets, which are fleshy, glossy green, slightly toothed, and up to 6 in. long. The leaf stems are long and thick and the pale pink flowers are borne in arching panicles.

Propagation

Most of the begonias described can be propagated without difficulty. All of the fibrous group are best raised by cuttings. They are usually made 4 to 5 in. long, and cut just below a node with the leaves trimmed off the lower half. They may be made at almost any time of the year except in winter in cold districts if a glasshouse is not available, but they root best in late spring and summer. Sand or a mixture of sand and leaf mould is the best rooting medium, but many of the more vigorous kinds such as *B. coccinea* can be rooted in the open ground in warm districts. Old clumps may be lifted and carefully divided after cutting them back.

The rhizomatous group including Rex begonias may be propagated by cutting the rhizomes into pieces about 2 in. long. Each should have a couple of well developed eyes. Those which root along the rhizome as it grows are simply planted shallowly in a horizontal position in a light, open potting mixture. Those which do not make roots as the rhizome grows (for example, *B. manicata*) need slightly different treatment. The pieces should be planted horizontally to about half their diameter in sand with the most advanced eyes on top. After rooting they can be potted up in the usual way.

Rex begonias may also be propagated by leaf cuttings. The leaves must be fully mature; otherwise they may rot off before rooting. Very old leaves are also unsuitable. There are two methods, the first being the easier. The leaf is cut off with a short length of petiole and the main veins severed about 1 to 2 in. from the central point from which they radiate. The leaf is then laid flat on some damp sand or a sandy mixture. It should be held firmly in position by placing a few pebbles on it or it can be pegged down with a few pieces of bent wire. It should be placed in a warm glasshouse or frame and shaded. Care must be taken with watering. Too much will cause rotting and too little will allow the leaf to dry out. Small plants will arise at each of the cut veins. When large enough they can be removed and potted up.

The second method is by cutting the leaf into triangular pieces. One point should have a section of the main veins where they branch from the leaf stalk, and from this 2 or 3 veins should radiate. The pieces should be planted in an upright position about $\frac{1}{2}$ in. deep, with the point with the veins down.

Work for January

Spraying and Weed Control

The prospect of finding a simple chemical control of weeds in home gardens is remote because within very small areas a wide variety of plants are grown and, too, garden plants are usually less aggressive than commercial crops. The garden plants may be smothered before the weeds have reached a stage of growth when they are susceptible to chemical control without damage to the plants or during the time it takes for the chemical to work, and it may be necessary to repeat the sprays. The spray pump or watering-can used for weed control is often permanently contaminated; the risk of spray drift causing damage to desired plants in the garden and in the neighbourhood is high. These are

By ROSALIE A. CAMPION,
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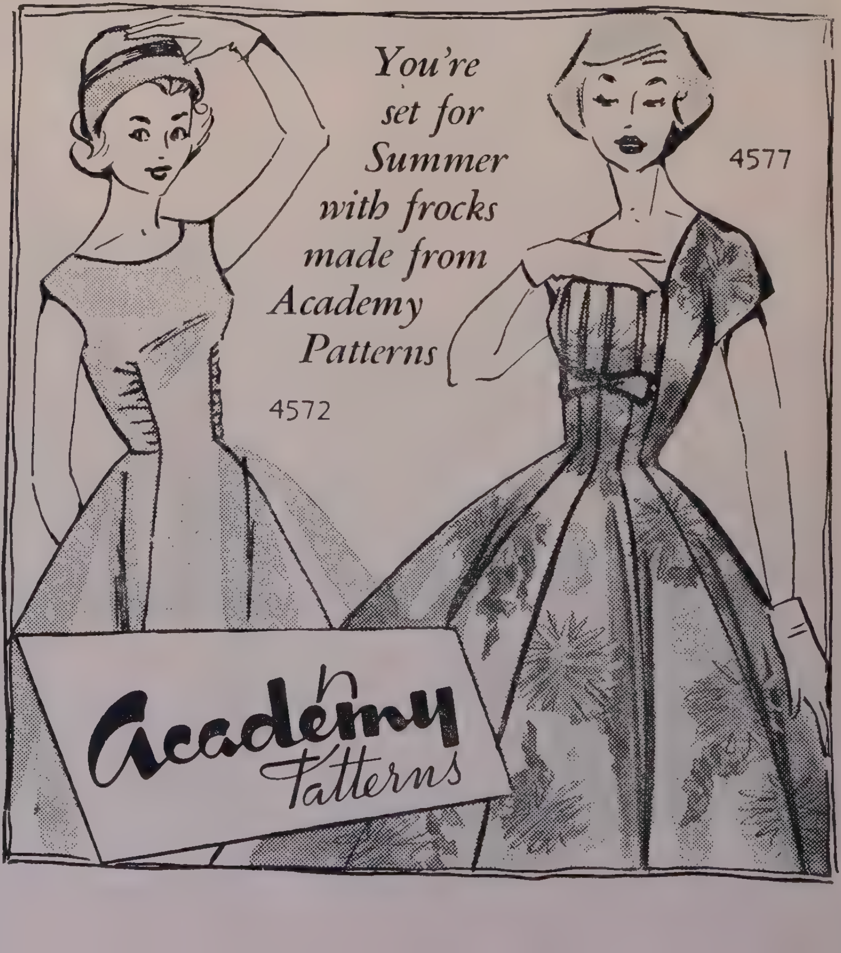
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some of the reasons why the home gardener is well advised to refrain from spraying to control weeds and instead should restrict spraying activities to the prevention and control of pests and diseases.

Oxalis

Oxalis is one weed which when established among shrubs is difficult to remove by digging. Many chemicals have been tested over the years, but none of these will control oxalis without killing the garden plants among which it may be growing, and in planted areas digging is the only possible method.

Where oxalis occurs in fairly large areas and not among shrubs, chemical control on the following lines may be practicable.

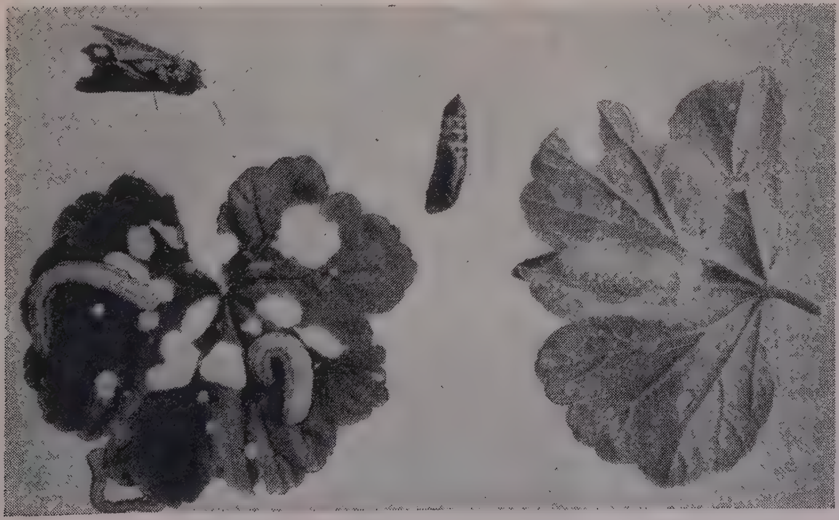
Probably the best and safest material to use is vapam, which can be applied at any time during summer to the summer-flowering types of oxalis or in autumn against autumn-flowering species. It should be applied while the plants are in full leaf or after the area has been cultivated. It should be used as a soil drench, and repeat treatments may be necessary where large quantities of oxalis bulbs are present.

It is advisable to wear rubber gloves and boots while applying this material, as it is unpleasant to handle.

One quart of vapam is required to treat 10 sq. yds. This can be applied by mixing with water in a watering-can and treating the area evenly. The material vaporises rapidly and immediately after application the area should be drenched with water (the hose is the easiest method) to seal the fumes in the soil. This water seal should be maintained over the next week by repeated waterings or by covering the treated area with damp sacks. After a week the area can be aerated by forking and after another week it may be planted.

Ivy-leaved geraniums are excellent for covering dry banks or dry areas round the bases of large trees. Cuttings of these can now be taken.

▼ Geranium leaves should be sprayed if looper caterpillars are present. The larvae, pupa, and adult of these caterpillars are shown.



Sodium chlorate (available commercially as Atlacide in a form safe to use by home gardeners) used at 1 lb. per sq. yd. gives reasonable but not complete control and areas will soon become reinfested unless the treatment is repeated. This is practicable only on paths and waste areas, because the ground will be unfit for planting for at least 6 months. On heavy clay soils planting may need to be deferred for up to 18 months.

Control of Soil Pests

Millepedes are short, dark brown, hard-shelled animals with numerous short legs on either side of their worm-like bodies. At this time of the year instead of damaging the leaves of seedlings, roots, and underground portions of a large number of plants, they often invade houses, generally coming in through the doors. They do not like dry conditions and die in a few days, curled up like a watch spring, a position which they usually take up when disturbed. If invasions occur, doorsteps should be painted with dieldrin emulsion. This material can be used as a spray where millepedes are causing damage in the garden.

Aldrin and lindane are both effective for the control of wireworms in the flower garden. These insects, which are between 1 to 2 in. long and cream to brown, have a tough metallic skin and attack the roots of many plants.

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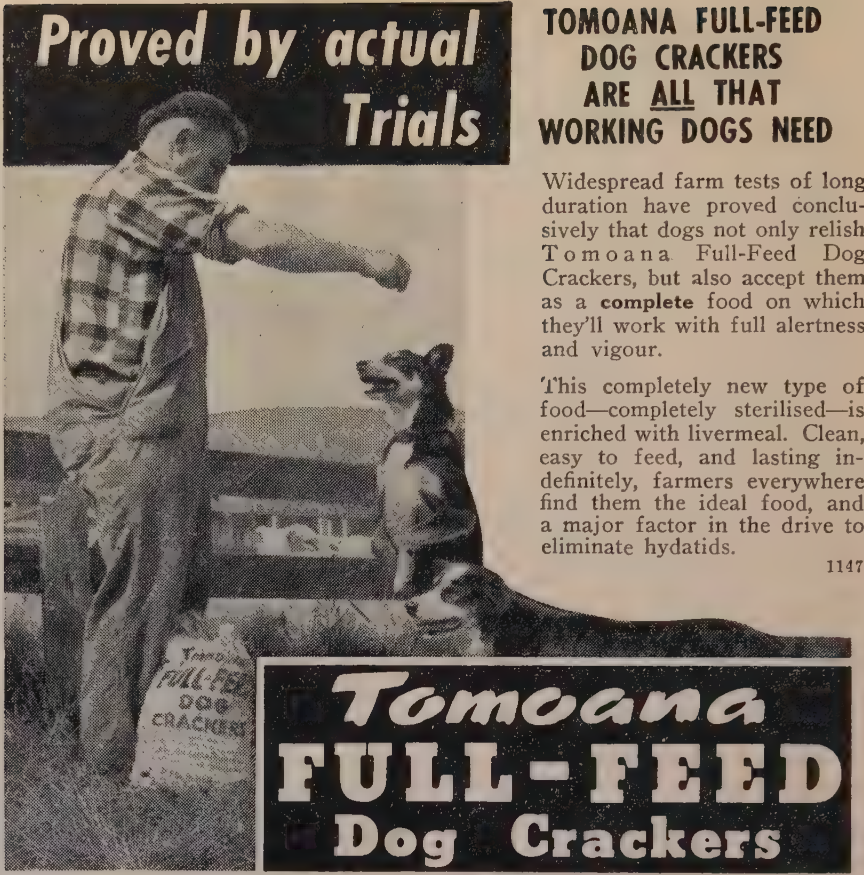

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The active white springtails are also controlled by these materials or by soaking the ground with nicotine sulphate in solution.

Lawns

Though growth will have slowed down considerably now, mowing should be continued with the blade set a little higher. Especially on sandy soils, the grass can brown off quickly during the next 2 months. A good soaking with the hose every 10 days is preferable to a sprinkling each night.

The subterranean caterpillars which hatch from eggs of the porina (*Oxycanus*) moth begin at this time to make vertical tunnels in the soil about the width of a lead pencil. Close to the exit holes are many worm-like casts containing silken threads. The caterpillars feed above ground at night and though damage may not now be extensive, by the end of winter it could be. To control this caterpillar and also the grass-grub lawns should be proofed with DDT every second year. This could be mixed with the usual 3-monthly fertiliser application using the following to 40 sq. yds. of lawn:

1 oz. of 50 per cent DDT
30 oz. of sulphate of ammonia
10 oz. of superphosphate

or 1 oz. of 50 per cent DDT can be used alone, sprinkled evenly over the 40 sq. yds. of lawn by mixing with dry soil or sand.

Geraniums

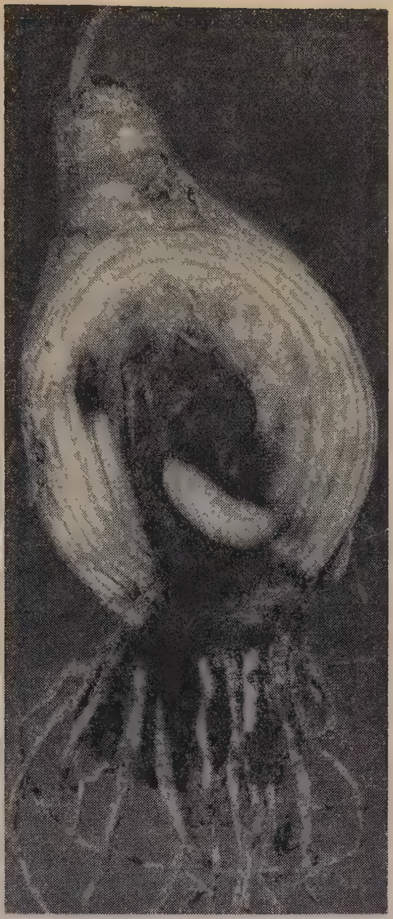
Geraniums are regaining popularity and will be adding colour to many gardens. Some varieties are more susceptible to the rust fungus which develops brown pustules on the underside of the leaves, and these varieties should be avoided. Sprays of zineb or a mixture of:

3½ fl. oz. of lime sulphur plus
1½ oz. of colloidal sulphur to
1 gallon of water

will help in the control of this disease. Ivy-leaved geraniums are not so susceptible and, coming in a wider colour range, they are an excellent plant for many sunny corners, especially in the North Island.

Cuttings of geraniums can be taken now. A cut should be made about 3 to 4 in. from the tip of the cutting and directly below a node. The bottom leaf and the leafy stipule just below it should be removed. Succulent cuttings of the bedding or zonal types should be allowed to dry out for several hours to discourage the entry of soft-rotting fungi. The cuttings should be firmly inserted in coarse sand and watered into position. The cuttings should be placed to root in a shaded area.

The looper caterpillar often eats geraniums, and sprays of DDT, lindane, or malathion should be used to combat this pest.



[*Shell photograph*

A bulb attacked by the maggot of the large narcissi fly.

Propagation

Carnations can be layered this month or grown from cuttings. Plants which have unhealthy foliage should not be used and plants showing leaf spotting should be sprayed with thiram, ferbam, or copper oxychloride.

A wide range of shrubby plants can be grown from cuttings of new growth which is only partially matured. These are often referred to as half-ripe cuttings. Cuttings of ericas, boronias, and manukas should be 1 in. long and taken from the shaded inside area of the bush. Cuttings of evergreen azaleas, luculias, hibiscus, abutilon, fuchsia, and similar plants should be 3 to 4 in. long. The cuttings should be firmed into a sandy medium and, after watering, placed in a shaded position. Scrim such as that used for onion bags could be used to provide the shade. If cuttings are being rooted in pots, after draining the whole pot can be enclosed in a polythene bag until well rooted. The cuttings can breathe inside this material, but the moisture does not escape. The atmosphere inside should not be so moist that rotting is induced. Cuttings of Marguerite daisies root readily this month.

Seed of myosotis, Iceland poppies, and winter-flowering sweet peas can be sown now. A pinch of thiram agitated in each seed packet will improve germination. Seedlings sown previously should be pricked out when they are large enough to handle.

Planting

Some early flowering plants are already past their best and should be replaced by calendulas or gaillardias to continue the display into autumn.

The early flowering lilies such as *Lilium regale* and *L. candidum* can be transplanted after flowering. The lily mosaic virus has been spread throughout many gardens by aphids and the plants should be sprayed with lindane or malathion whenever aphids are seen. Plants which show the symptoms of stunting, flower reduction or distortion, streaking or yellowing of the leaves, or brown necrotic spots should be dug up and burnt. New plants can be raised from seed which does not carry the virus.

Other bulbs which can be planted now are *Amaryllis belladonna*, autumn crocus, nerines (except *Nerine bowdeni*), and *Iris reticulata*. *Nerine bowdeni* should be planted after flowering in April.

Cutting Flowers

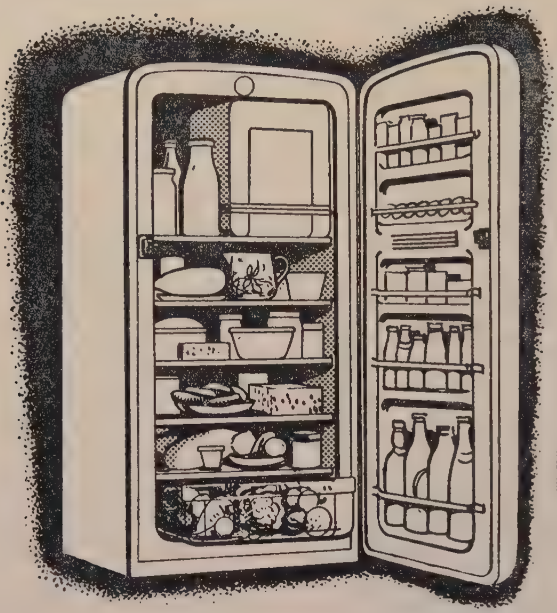
Many flowers are grown to perfection and brought to a sudden end when cut for use indoors. Most flowers last longer if picked first thing in the morning and under dry conditions. All will benefit from a good soaking in deep water for several hours. The washhouse tub is usually a cool and convenient place to do this. The flower stems of geums, euphorbias, clematis, mignonette, dahlias, campanulas, and poppies need their ends either burnt or boiled to coagulate the latex and prevent it from blocking the entry of water into the sapstream when soaked. Some woody stems respond to bruising which exposes a greater surface of water-absorbing tissue.

Most flowers, and roses especially, should be placed in water as soon as possible after cutting. The picking bucket is preferable to the usual picking basket.

In the Border

Pansies and violas can be cut back hard to encourage new growth from the bases of stems. The bush is quickly covered with regrowths.

Dahlias may be given a further side dressing or liquid feed. If blooms are required for a show, some disbudding of side shoots should be done. Thrips and leafroller caterpillars often appear on dahlias and sprays of malathion will kill both of these. Alternative spray materials are DDT or dieldrin



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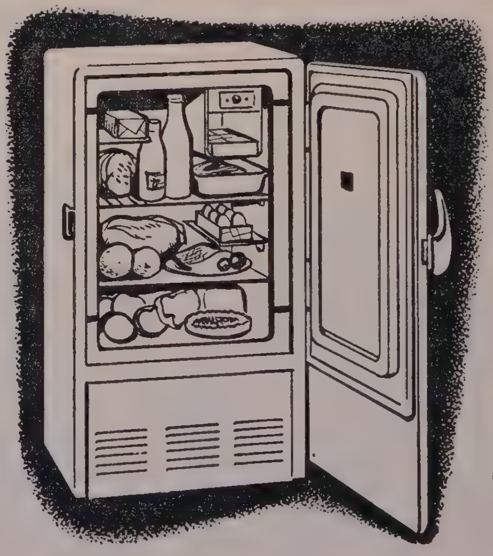

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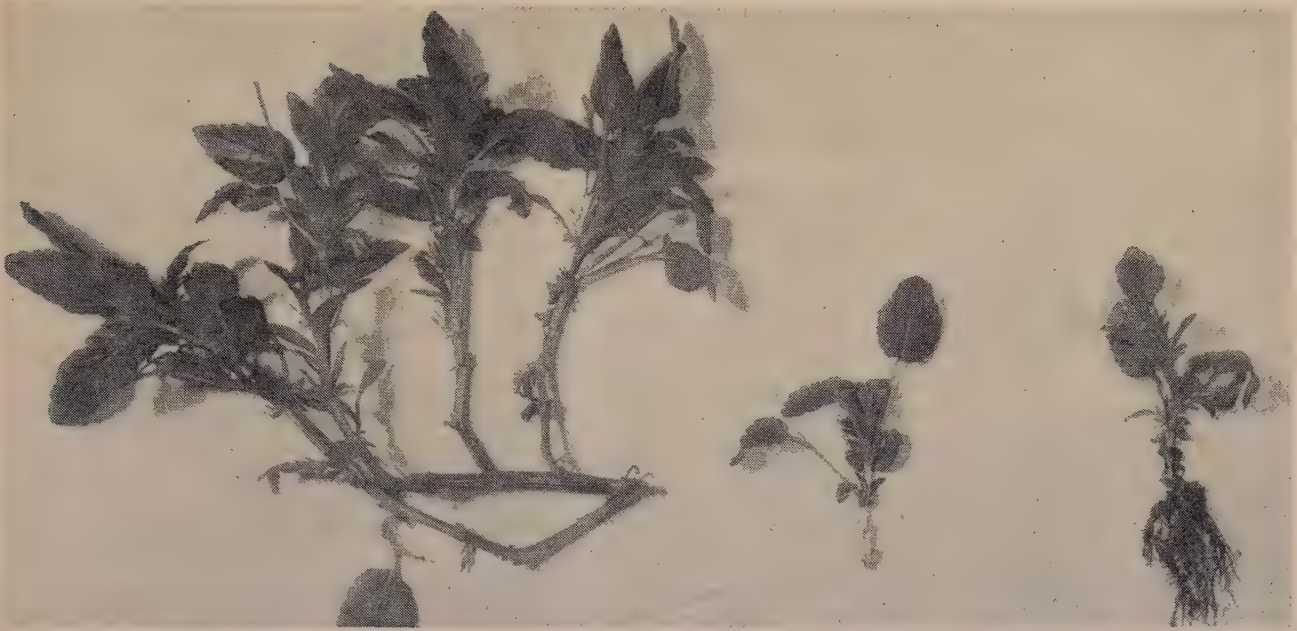


Pansies and violas can be cut back hard to where short, young shoots are developing at the centre. These shoots root readily and form new plants. Short, sturdy shoots with leaves growing close together make the best type of cuttings (centre), and long, straggly shoots (left) should not be used, though they will usually root in time. A supply of short shoots can be obtained by cutting off all the straggling shoots near the centre of each plant, which will then send up a number of new shoots ideal for cuttings. A well rooted cutting is shown on the right.

emulsions or summer oil plus nicotine sulphate for thrips and arsenate of lead for the caterpillars.

Staking should be checked on all border plants to avoid disappointment after strong winds. Chrysanthemum plants which have been well nipped back early in the season will have developed a more bushy habit and not require extensive staking. Side shoots should be removed from the developing stems of these plants to encourage straight, clean stems.

Mulching materials such as compost, spent hops, sawdust, lawn clippings, or animal manure can be applied to the surface of the moist soil.

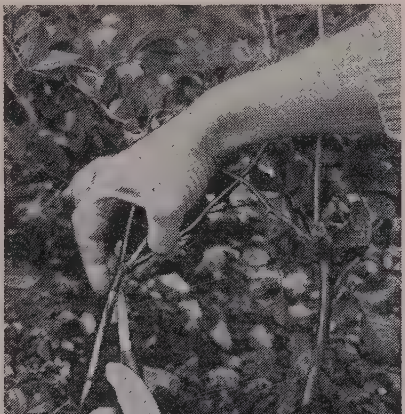
Roses

The true rambling roses such as American Pillar should be pruned when flowering concludes by the removal of spent flowering branches. The use of the combination sprays and dusts given in the October issue of "The Journal" should be continued to maintain the health of the plants.

Budding can start as soon as the bark of the stock lifts readily. The buds should be taken from mature growths of the current season. The wood is mature when thorns snap off readily and cleanly. A T-shaped cut should be made in the stock as near ground level as possible and the bark can be lifted carefully. The bud should be cut shallowly from ½ in. below to ½ in. above the bud. This should be inserted promptly in the T cut and bound with raffia or PVC plastic.

Lifting of Bulbs

Spring-flowering bulbs can be lifted now. The presence of the larvae of narcissi bulb fly may have made the bulbs feel soft or even caused collapse. In bad cases bulbs should be destroyed. Firm bulbs and those only partially affected should be dipped for 10 minutes in a mixture of 4 fl. oz. of aldrin emulsion to 2½ gallons of water. This will kill the larvae and protect the bulbs for next season. The bulbs should be cleaned before dipping and later dried and stored in a cool airy position until planting time.



Budding of roses. The bark being eased back after the T cut has been made before the insertion of the bud.

General

Cyclamen can now be potted up for the following season, watered, and placed in a cool, shady place to encourage growth before they are returned to the glasshouse at the end of February.

Hyacinths, lachenalias, and freesias could be potted up for winter flowers indoors. They should have cool conditions until the roots establish.

In the glasshouse young begonias and other flowering plants should be transferred to larger pots when the roots become crowded. Liquid fertilisers can be given occasionally to encourage continued flowering. Seed of calceolarias, *Primula malacoides*, and winter-flowering stocks can now be sown.

Bulbs for planting during the next 2 months should be ordered and stored in cool conditions on arrival.

Gladiolus should be lifted 6 weeks after flowering and well dried before storing. Plants of bearded iris, peony, and pyrethrum can now be lifted and divided before replanting.

Scale insects found on many woody plants should be sprayed now with 8 fl. oz. of white summer oil to 4 gallons of water.

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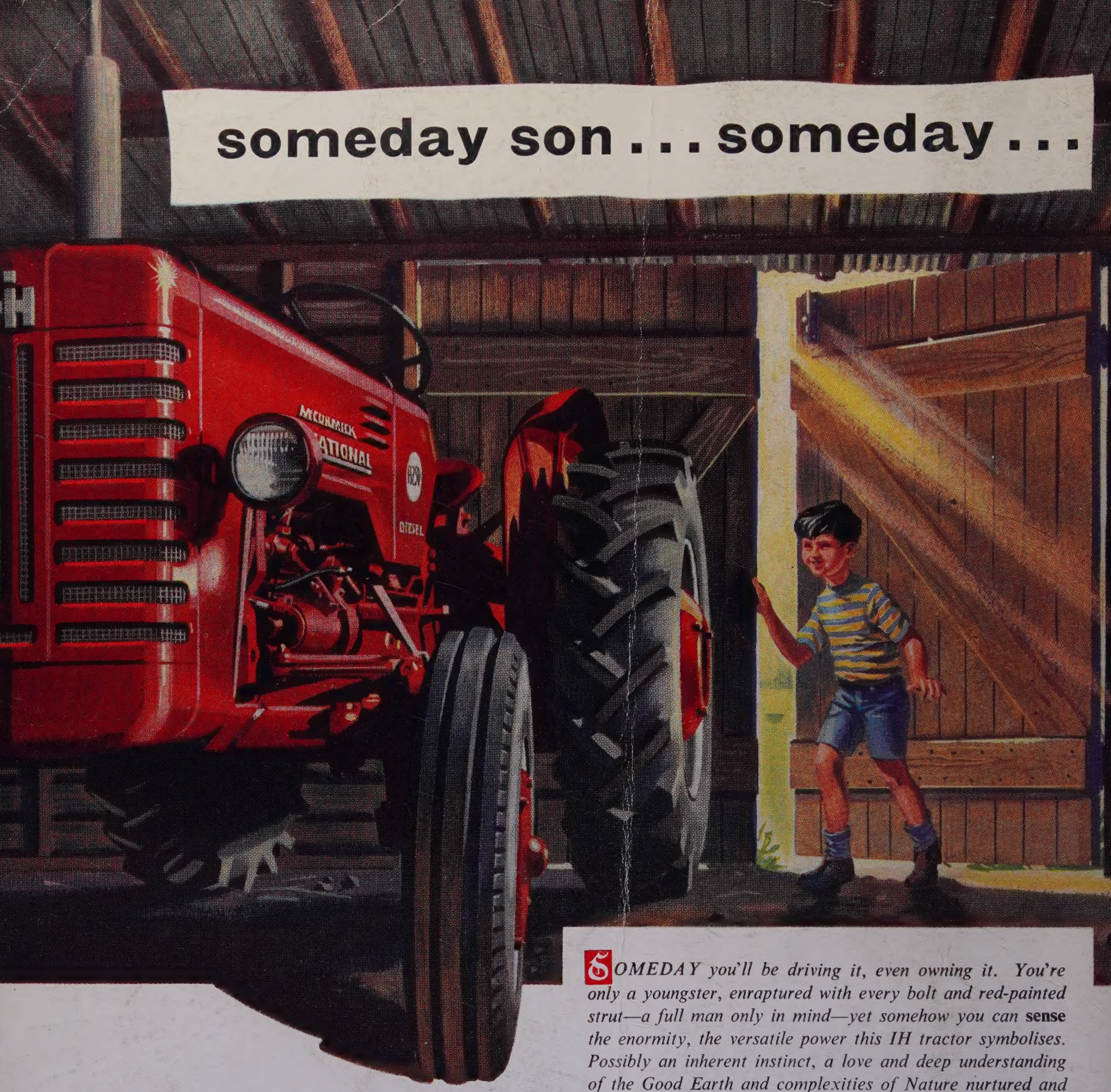

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